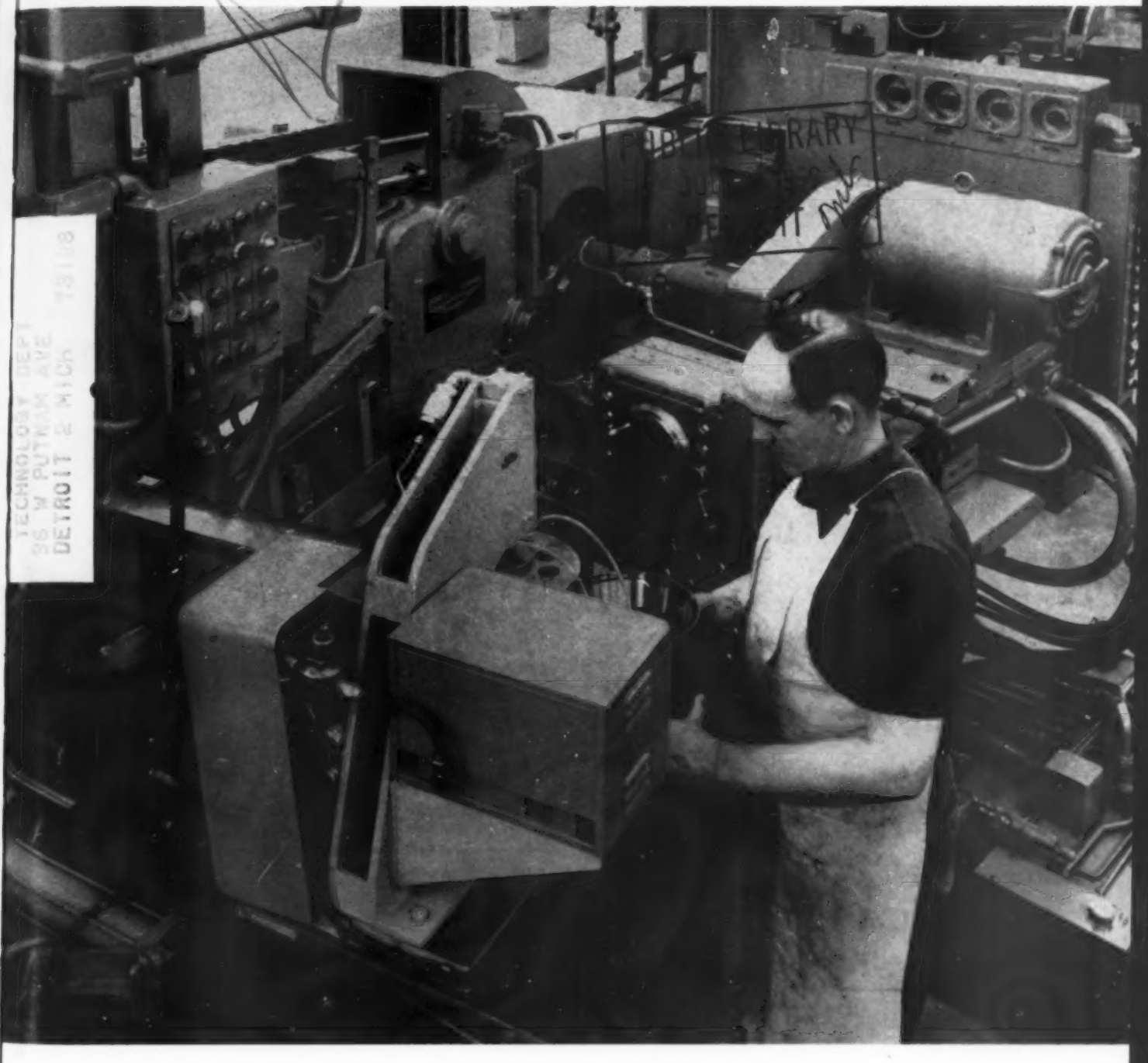
TECHNOLOGY DEPT.

# Grinding and Finishing



TECHNOLOGY DEPT
96 W PUTNAM AVE
DETROIT 2 MICH 48202

## Grinding at the New Timken Railroad Bearing Plant

also in this issue:

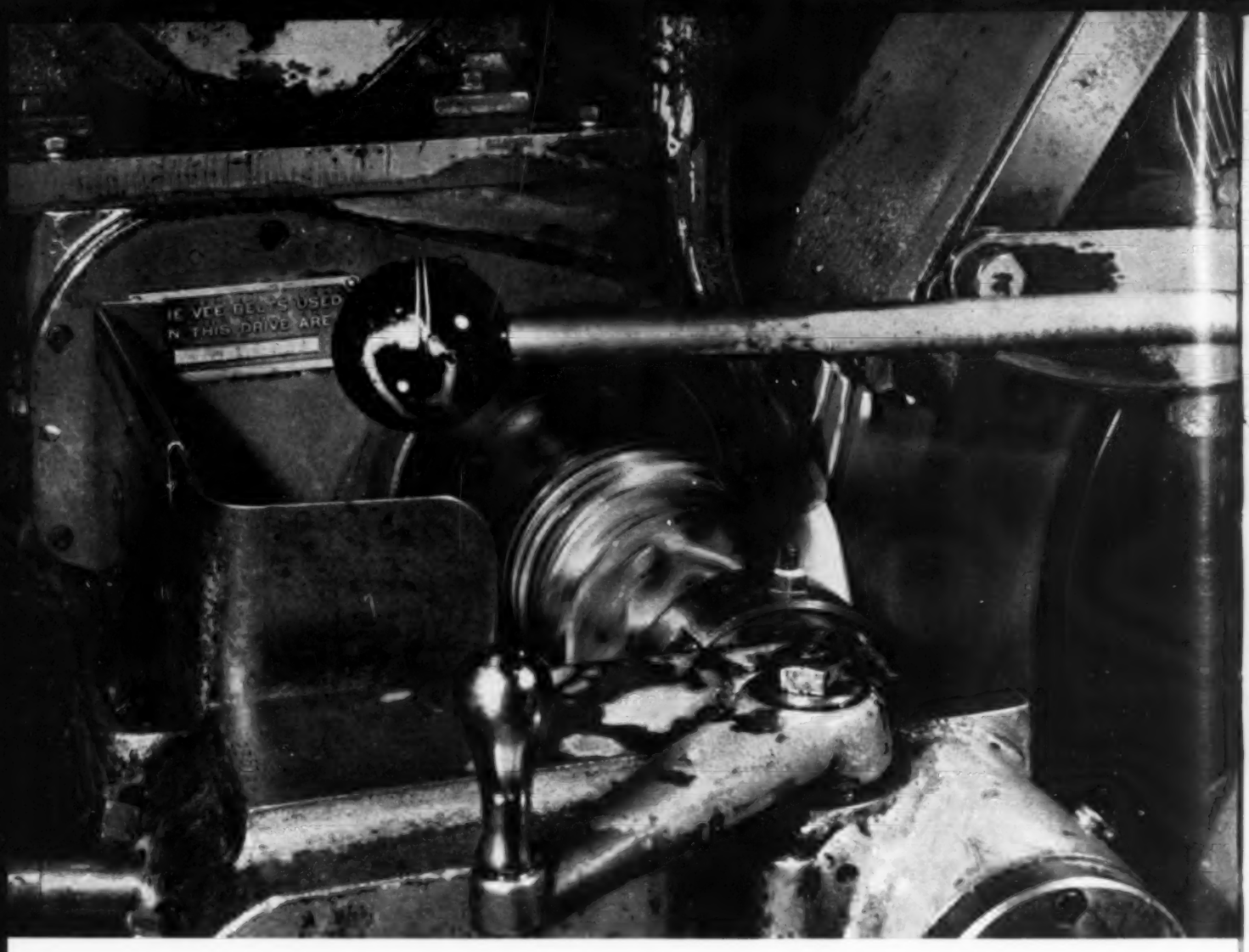
Electronic Gaging Updates Old Cylindrical Grinder

Effect of Work and Grinding Wheel Speeds on Surface Conditions

The 3rd Coated Abrasives Machinery Show

a hitchcock publication

july 1958



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LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

...wherever abrasive operations are performed

# grinding and finishing

Contents • July, 1958

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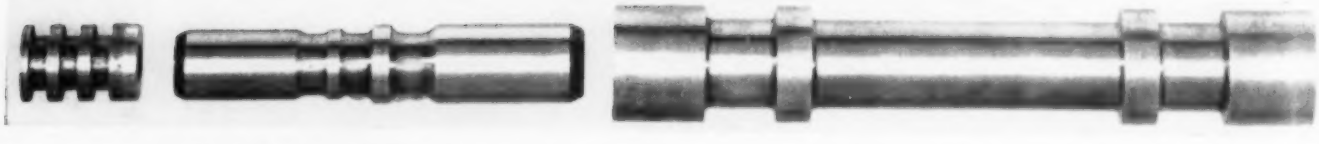
# CINCINNATI gives you a New Concep

CRUS

**CINCINNATI FILMATIC No. 1 Centerless Grinding Machine,** with Crush Truing Attachment *(left)* and Electro-Hydraulic Automatic In-feed Attachment. Catalog No. G-703-1.



**Crush form ground parts,** produced on a CINCINNATI FILMATIC No. 1 Centerless. Notice the sharp bottom corners and accurate blended radii . . . they're easy to obtain with Cincinnati Crush Truing equipment. Center part is ground in one cut, removing .015" on dia., production 250 per hour.

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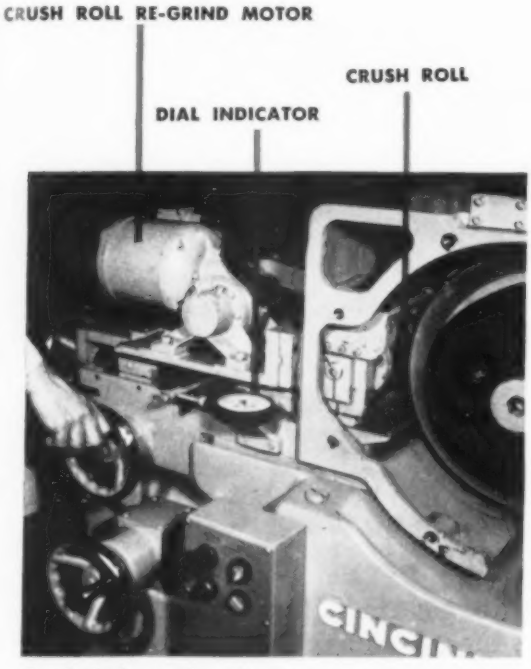
# in Centerless Form Grinding with

# TRUED WHEELS




**Crush Truing unit,** with cover removed, mounted on CINCINNATI FILMATIC No. 1 Centerless Grinder.

New methods are always enhanced by the latest design equipment. Take centerless form grinding with crush trued wheels, for example. Cincinnati has developed a new, highly proficient Crush Truing unit for CINCINNATI FILMATIC Nos. 1 and 2 Centerless Grinding Machines. It incorporates several new ideas in wheel crushing which contribute to the end result of precision form grinding at the lowest possible cost.

**Exceptional rigidity** for the entire crushing system is assured by Cincinnati's bed-mounted spindle construction.

**Minimum setup time.** Crushing rolls are cartridge mounted and easily interchanged. Lateral adjustment provided for positioning.

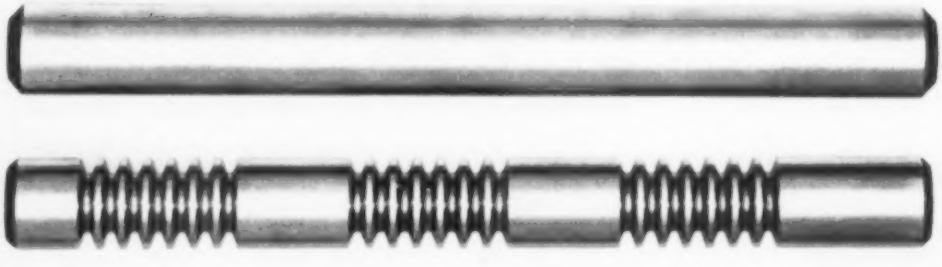
**Dial indicator** provides visible check on crushing feed rate. Handwheel for rapid positioning.

**Long crushing roll life.** Rolls are 5½" diameter for No. 1 Centerless and 6" diameter for No. 2 Centerless. Separate motor drive to re-grind worn rolls in position.

**Correct grinding wheel speed** for crushing, through an auxiliary motor drive and overriding clutch.

**Profile diamond wheel truing** unit included for "roughing out" the desired shape in the wheel.

Low-cost crush form grinding on a CINCINNATI Centerless is augmented by many Cincinnati exclusives such as FILMATIC grinding wheel spindle bearings and the world's most experienced Centerless Grinding Engineering Service. Look into this method of precision grinding as a new production idea. You can start by writing for Cincinnati Crush Truing brochure No. G-706.



**Rack teeth crush form ground** from the solid in one operation on a CINCINNATI FILMATIC No. 2 Centerless. Major diameter .500", minor diameter .320" (.090" depth of cut). Before and after grinding illustrated.

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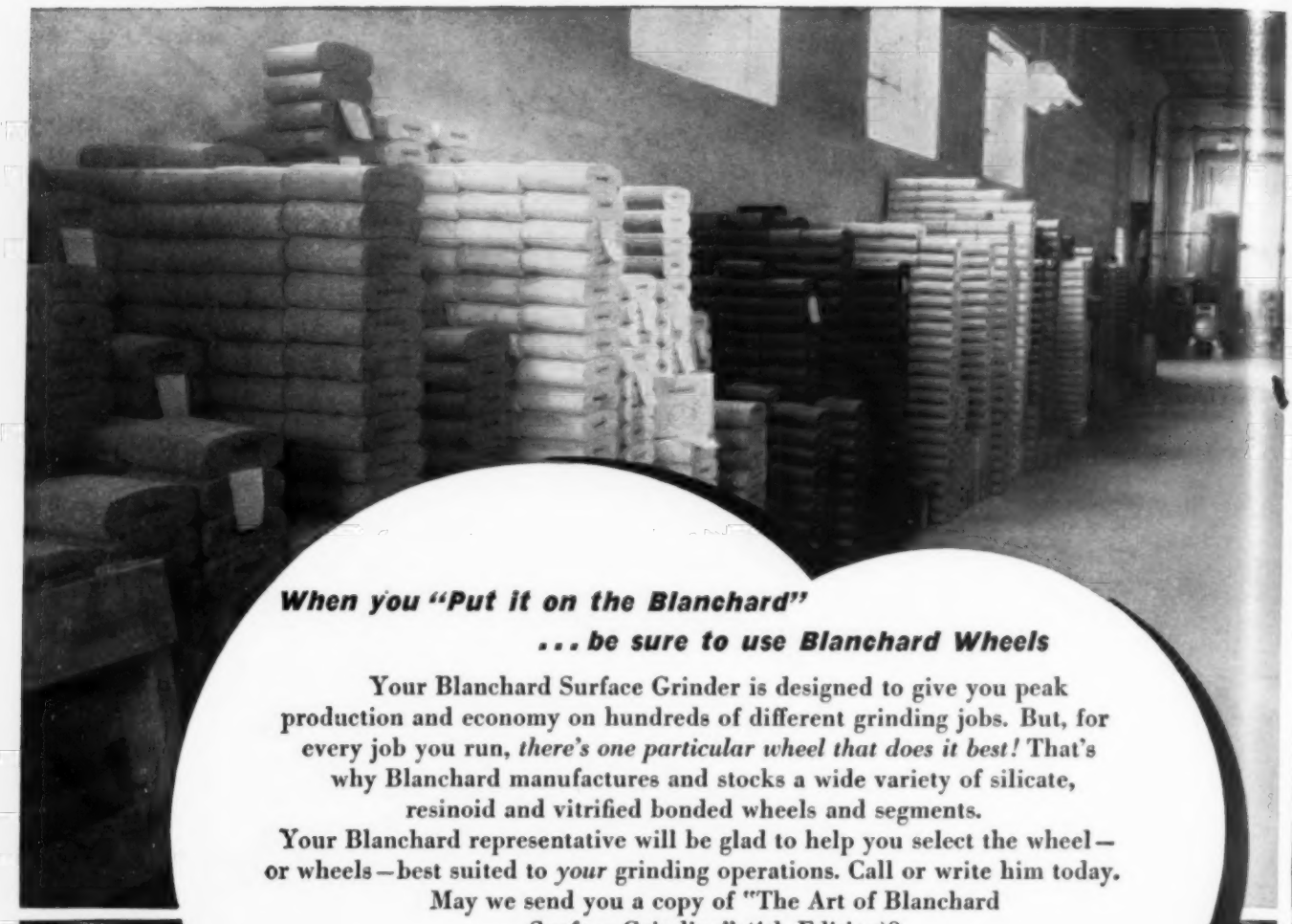

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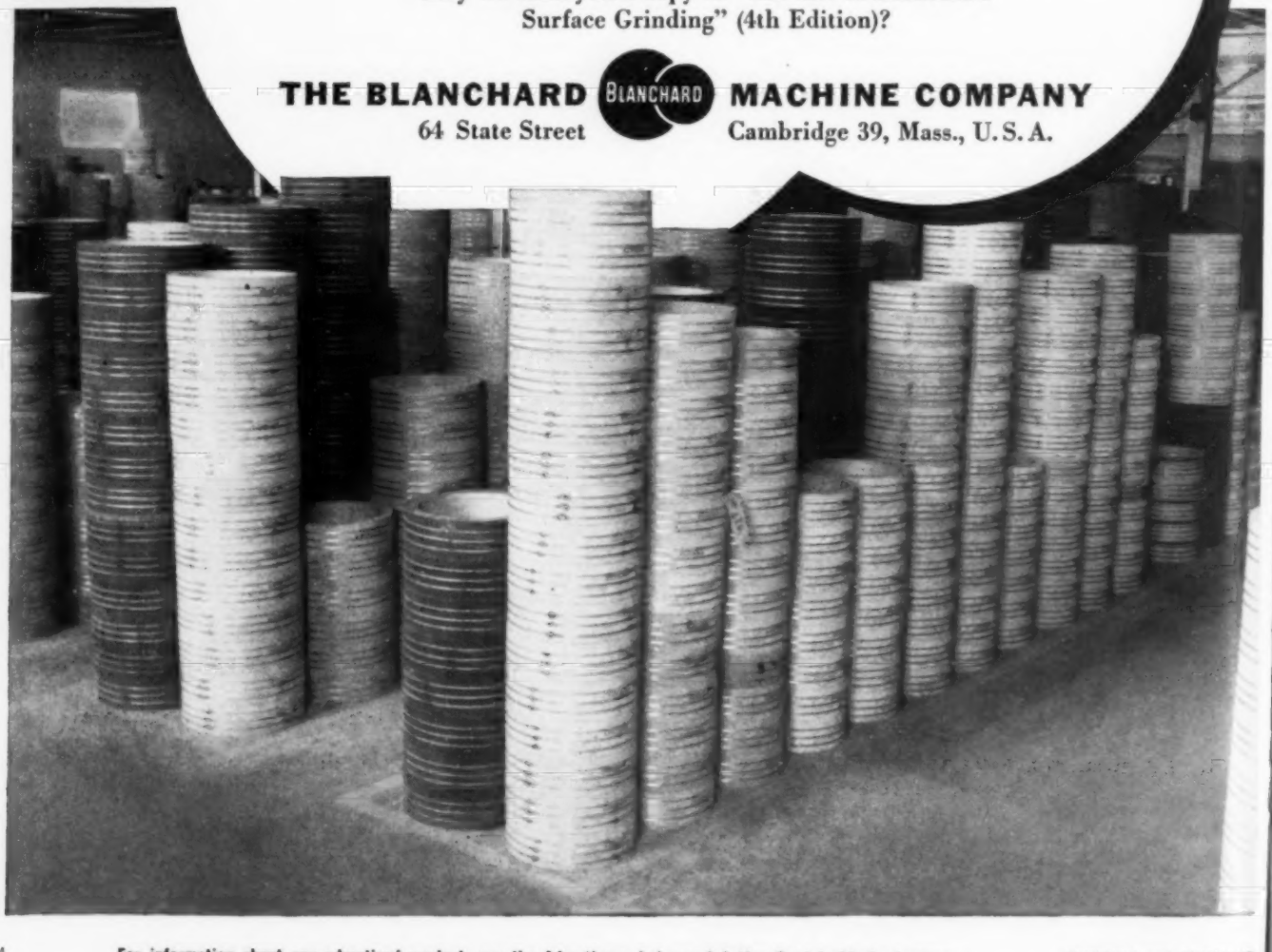

# Letters to the Editor

### Cleaning of Coolants

We have read, with interest, your feature article in the March 1958 issue, "Part 1—The Cleaning of Grinding and Finishing Coolants" by Arthur L. Wilson. Please advise if Parts 2, 3 and 4 of this article have been published and send us reprints if available.

We have found Part 1 of considerable value to us on this difficult subject of cleanliness of coolants, and, look forward to studying the subsequent parts of this article.

*B. L. Schwaller*
*Tactair Valve Div.*
*Aircraft Products Co.*
*Bridgeport, Pa.*

### Diamond Grinding Wheel Manufacturer

Due to our recent acquisition of the Blanchard Diamond Tool Co. of Chicago, Ill., and since that we now manufacture diamond grinding wheels, this magazine is proving very interesting.

*Jack D. Harmon, Vice-Pres.*
*Harmon Machine Co., Inc.*
*Wichita, Kans.*

### Super Finishing

Would you please send us 50 reprints of your article, "What Is Super Finishing," appearing in the March, 1958 issue of *Grinding and Finishing*.

*Robert W. Hanpeter*
*Sunnen Products Co.*
*St. Louis, Mo.*

### Grinding at McGill Mfg.

An article concerning grinding at McGill Manufacturing appears on page 20 of the April issue of *Grinding and Finishing*. We would very much appreciate having two copies of this issue, and are interested in additional reprint copies or tear sheets of the article.

We would like to circulate these to our sales department, and would require thirty reprint copies if they are available.

*D. C. Whitesell*
*McGill Manufacturing Co., Inc.*
*Valparaiso, Ind.*


Ever see a ROUND WHEEL fit into a SQUARE CORNER ?

GRIND-O-FLEX DOES IT

Unretouched photo

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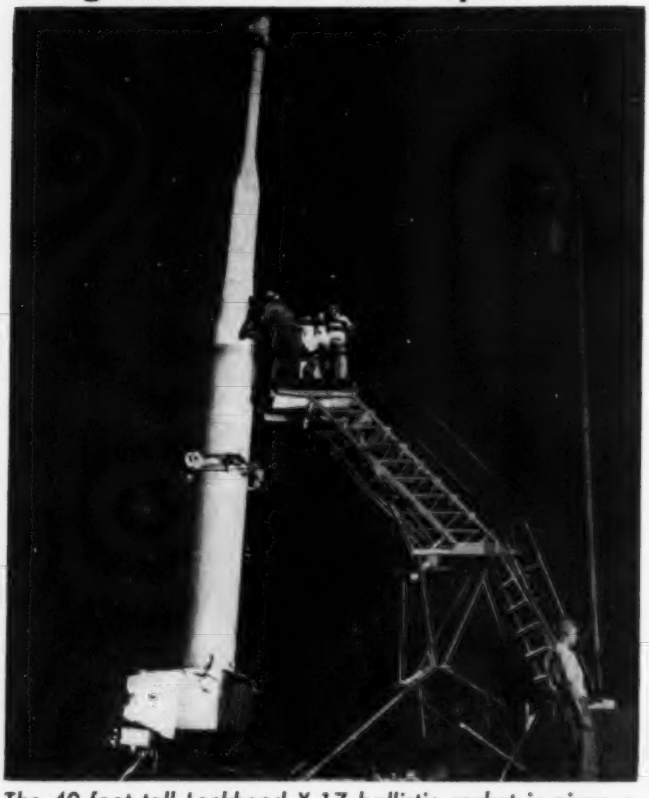
. . . wherever abrasive operations are performed

# Grinding and Finishing Around the Country

## More Than 20 Nose Cones Brought Back From Outer Space



*The 40-foot tall Lockheed X-17 ballistic rocket is given a final checkout before blasting off from Cape Canaveral, Florida, on a ballistic missile nose cone test flight.*

The Air Force has brought more than 20 ballistic missile nose cones back from outer space successfully through the extreme heat generated by re-entry into the earth's atmosphere.

Commenting on the achievement, Major General Bernard A. Schriever, Commander of the Air Force Ballistic Missile Division, said the re-entry problem was simulated using the three-stage Lockheed X-17 ballistic missile which carried the experimental nose cones thousands of feet into space and then reintroduced them at high speed into the dense, friction-creating atmosphere of the earth.

Two important techniques were involved in the X-17 program. These were the use of a free-flight approach with the X-17 to simulate conditions the operational missiles would encounter, and the use of telemetering data (radio signals) from the X-17 during its journey into space, its hypersonic plunge through the atmosphere, and down to impact. The telemetering system transmits data on speeds, temperature, pressures and other quantities, almost to the instant of impact. •

## New $1,500,000 Electronic Brain Installed at Lockheed Missiles

Installation of a new $1,500,000 electronic brain at Lockheed Missile Systems division's Palo Alto computing center is emphasizing the increasing tempo of activity on Lockheed's two high-priority space-age projects—the Navy's underwater-launched Polaris missile and the Air Force's huge reconnaissance satellite.

Capacity of the division's computing facility—one of the most up-to-date in industry—was more than doubled when the new Univac Scientific digital computer was installed. The Remington Rand computer with its associated equipment occupies 1900 sq. ft. of floor space.

Typical of the type of problems encountered by Lockheed's mathematics and computer services department is: Pinpoint a missile's trajectory at each quarter of a second of its predicted flight. This information is compared with the pre-computed theoretical trajectory stored within the computer. It took a mathematician 29 days to program the problem. Univac supplied the answers in less than five minutes. •

*One of a series of experimental aluminum V-8 automotive engines, announced by General Motors, is shown being lowered into a test car. Weighing about 30% less than cast iron V-8 engines, the experimental jobs were co-operatively developed by GM Research Staff and GM Engineering Staff. They already have undergone successful laboratory and road tests.* •

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Chicago Wheels are available in all standard sizes and over 200 special shapes. This wide selection of these tough, fast cutting Chicago Mounted Wheels makes it possible for you to choose just exactly the right mounted wheel for your job. And delivery of most Chicago Mounted Wheels is prompt . . . right out of stock.

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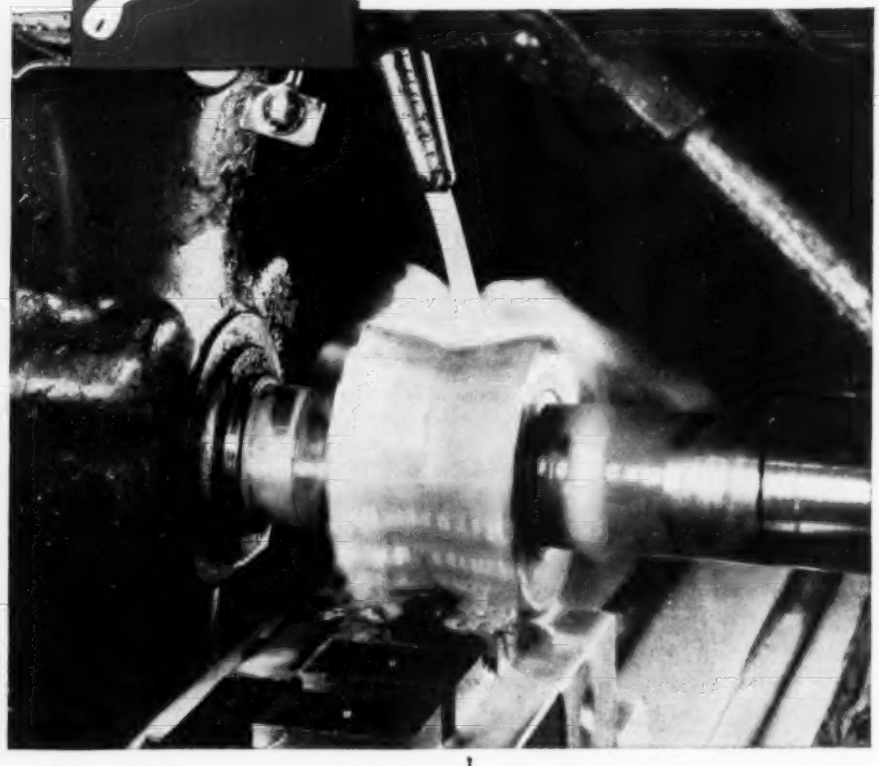

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## Grinding and Finishing Around The Country . . .

### Businessmen's Outlook—3rd Quarter 1958

Fewer businessmen foresaw year-to-year sales declines in the present Dun & Bradstreet survey than in the preceding one. Steady profits were foreseen, with little change in prices expected. Employment was thought to equal that of last year. •

### Salesmen's Mileage Payments Reach 8.84 Cents Per Mile

Mileage payments to salesmen driving their own cars on company business have reached an all-time high of 8.84 cents per mile, a jump of 12½% from a year ago. Michael Braude, President of Emkay, Inc., conducting an independent survey on fleet costs, disclosed that almost 10,000 cars were covered by the survey. •

### The Failure Record Through 1957

Dun's Failure Index shows that 52 concerns failed in 1957 for every 10,000 listed in the Dun & Bradstreet Reference Book. Dollar liabilities involved in 1957's failures surged to $615 million—another new peak for the postwar period. Reported failures include only those concerns involved in actions likely to end in losses to creditors. •

*Lightweight aluminum plays an important part in a revolutionary lighting system at Washington National Airport. The new system for low-visibility landings, a joint development of Sylvania Electric Products,*

*Inc. and the Civil Aeronautics Administration extensively utilizes mirror bright Dynasyl reflective sheet manufactured by W. J. Ruscoe Co. The system consists of 272 very high output (VHO) fluorescent lamps installed in 30" high aluminum reflector fixtures which extend along both sides of the runway. C.A.A. Flight Operations Specialist Robert F. Gates is shown with the lighting reflectors.* •

Robert Daly, Finishing Supervisor, holds sparkling Arrow pen clips finished in one of the nine ALMCO barrel finishing machines used by The Parker Pen Company.

**BECAUSE THE ARROW** is a trademark of The Parker Pen Company, the surface finish on each of these distinctive pen clips has to be more than just good. *It has to be superior!* What's more, production must be high and costs must be low.

That's why The Parker Pen Company now has *nine* ALMCO precision barrel finishing machines running *around the clock* in their parts deburring and finishing department. Used for cutdown operations, descaling after heat treatment, deburring and polishing, the scientific ALMCO Supersheen method helps the Parker people to meet high standards of quality, reduce costs and increase production, simultaneously!

Perhaps ALMCO finishing methods can do as well for you. It's no trick at all to find out. Just write us on your letterhead asking for an ALMCO sales engineer to call. Or, send sample parts and specifications on results desired direct to ALMCO's main laboratory at Albert Lea, Minnesota.

Meanwhile, send today for your FREE 52-page SUPERSHEEN barrel finishing handbook. Profusely illustrated.

Even though the nine ALMCO machines are in use 24 hours a day at Parker Pen, operators report that little maintenance is required to keep them in top-notch working order. That saves money, too!

**ALMCO**

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137 Marshall Street • Albert Lea, Minnesota
*Subsidiary of KING-SEELEY Corporation*
*Sales and Engineering Offices* in Chicago, Detroit, Los Angeles, Newark, New Haven and Philadelphia
**IN ENGLAND:** *Almco Division of Great Britain, Ltd., Bury Mead Works, Hitchins, Herts, England*

**. . . wherever abrasive operations are performed**

# News of Metalworking

## Electronic Chauffeur Vs. Human Driver

NEW YORK: Joseph B. Bidwell of General Motors Research Staff reported in a paper for a Columbia University Arden House Conference on electronic control and traffic safety that electronic devices for driving cars are at present more fallible than the human element.

The comments were based on tests on two experimental vehicles, a Unicontrol car that is steered, accelerated and braked by a single "stick" control, and a car that is steered automatically by an electrical or "magnetic" path produced by a cable in the pavement.

Bidwell said improvements in electronic techniques and component developments undoubtedly will strengthen future reliability in performing perception, decision and motor (response) functions of a human driver. Specifications for completely automatic control systems indicate that equipment will be needed both on the road and in the car. •

## Machine Tool Imports and Exports

CHICAGO: Unless the present tariff situation is somehow corrected the inevitable result will be the upbuilding of machine tool capacity in Europe and the decline of machine tool capacity in the United States, Alfred V. Bodine, President of the National Machine Tool Builders' Association, told members of the Association at its Spring meeting held at the Edgewater Beach Hotel.

Noted was the increase to 30% in imports, and the 10% decline in exports, due largely to the great difference in the U.S. and foreign tariff—up to 55% in some cases for foreign tariffs.

Three remedial steps suggested for the U.S. government were: (1) Establish tariffs or quotas on machine tool imports which will insure the national defense production capacity of the United States; (2) persuade foreign countries to relax licensing and importation restrictions and agree upon a tariff arrangement which is in face reciprocal, and (3) interpret the Buy-American Act so that it will not be mandatory for the Defense Department to buy a foreign built machine tool if its price is as much as 6% below a quotation by an American builder. •

## Thermoelectric Power Generation

CLEVELAND: Research people are currently investigating the direct generation of electricity from heat. This process involves the use of a power plant known as a thermoelectric generator, which is small, compact and has no moving parts. It is operated on the principle that when certain materials are joined together, then subjected to external heat, d.c. current is generated.

According to Dr. Eugene Wainer, Vice-President and Director of Research of Cleveland's Horizons Inc., recent advances in solid state physics, providing new materials, have resulted in renewed interest. Heat from nuclear fission and the rays of the sun so far are considered the best heat sources for activating materials to produce the desired current. •

## American Zinc Institute Sees 3.3 Million Ton Galvanized Market By 1960

ST. LOUIS: Leading North American zinc producers from all over the nation gathered for the opening session of the American Zinc Institute 40th annual meeting at the Chase-Park Plaza Hotels.

According to Ralph C. Miller, Jr., Assistant Manager, Sheet Mill Products Div., Jones & Laughlin Steel Corp. 1958 shipments of galvanized should be about 2,420,000 tons or slightly better than 1957. Also, the strengthening trend toward greater usage of steel sheets, particularly galvanized, for roofs, floors, exterior and interior walls, and heating system, plus the impact of a 44,000 mile interstate highway system should create a substantially enlarged market for galvanized, Miller said. It was estimated that shipments of galvanized sheets in 1960 should be 3,300,000 tons, or 23.4% above the average of shipments in the past two years. •

**The FIRST Oil-Free Water Soluble Coolant With Oily Properties**

# HAMIKLEER

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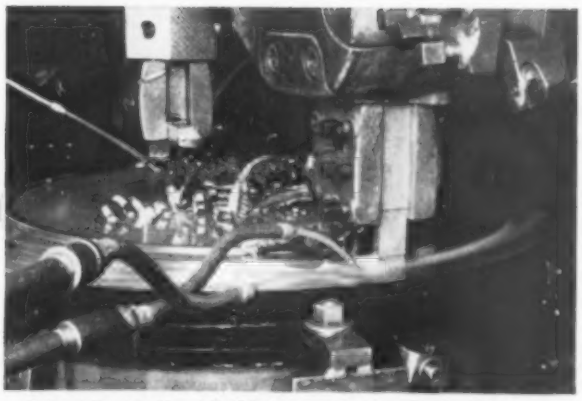
## Offers 9 Outstanding Benefits

HAMIKLEER is the latest idea in coolants for metalworking. This oil-free, water-soluble coolant and rust preventive is receiving wide acclaim because it:

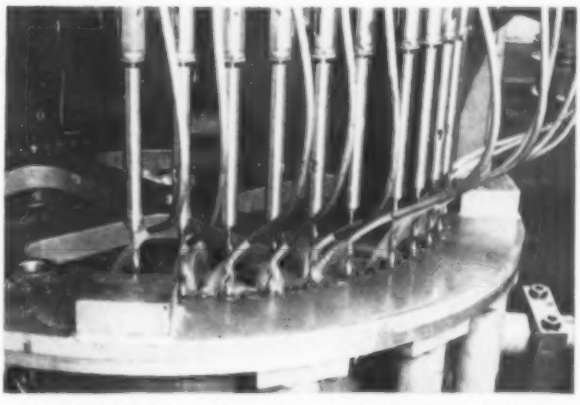
1. Eliminates the need for and cost of many different coolants as it can be used on a wide variety of applications.
2. Eliminates cleaning operations since it prevents rust.
3. Is rancid-proof, foam-proof, eliminating foul odors, increasing operator acceptance.
4. Eliminates rejects since it provides finer surface finishes, longer tool life.
5. Is transparent so gauging can be done without shut-downs.
6. Outlasts soluble oil emulsions by five times.
7. Costs less for make-up since only water is added.
8. Will not affect workers' skin.
9. Eliminates costly disposal problems. HAMIKLEER will not pollute streams if oils are kept out of mixture.

HAMIKLEER dissolves instantly in any water to make a clear, thin solution that can be made more dilute than is practical for ordinary soluble oils. The solutions are more efficient at the longest range dilution . . . as proved by years of experience on many different metalworking operations.

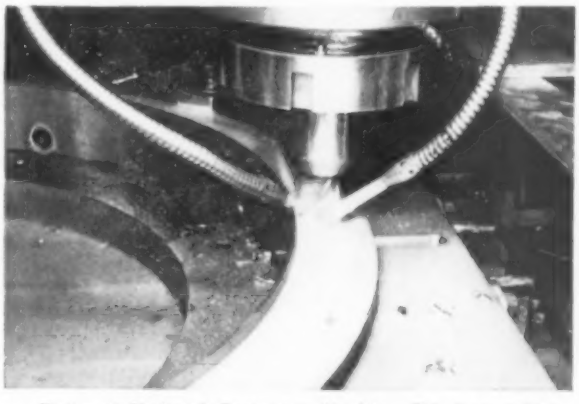
*Write for a free sample to test on your own metalworking operations.*



Bullard-Double Head Self-Indexing Machine. Stock: 410 stainless; Tools: carbide tips, both rough cuts; RPM: 40; Feed: .016; Micro Finish: 61; HAMIKLEER Dilution: 1:50.

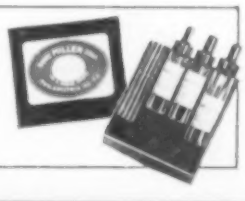


Bausch Multiple Drill Press. Tool: High Speed Steel; Stock: 316 and 410 Stainless; RPM: 400; Feed: .003; Tolerance: ± .005 Micro-Finish: 125 (without reaming); HAMIKLEER Dilution: 1:50.



Cincinnati Hydrotel Contouring Machine. This is a milling operation, end cutting scallops. Tool: High Speed Steel, 3 flutes high; RPM: 200; Feed: 3"; Depth of Cut: .530; Micro Finish: 61; HAMIKLEER Dilution: 1:50.

This free test kit is sent to all HAMIKLEER users. It permits operators to test dilution right at the machine, saving considerable time.



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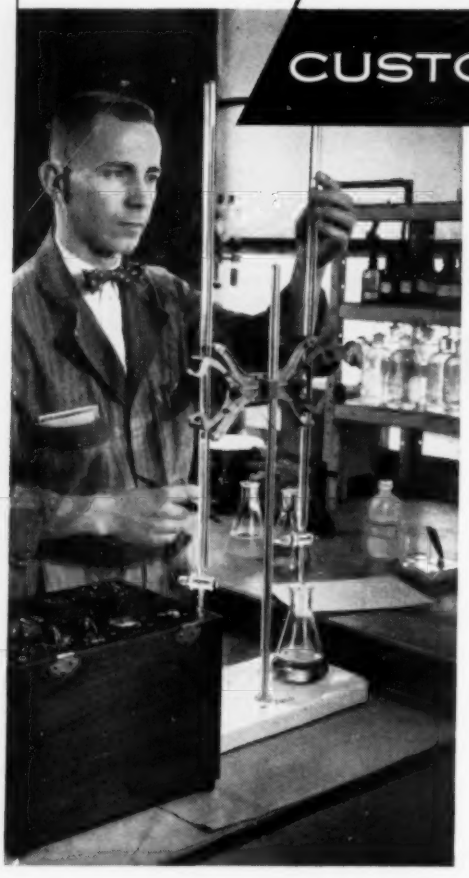

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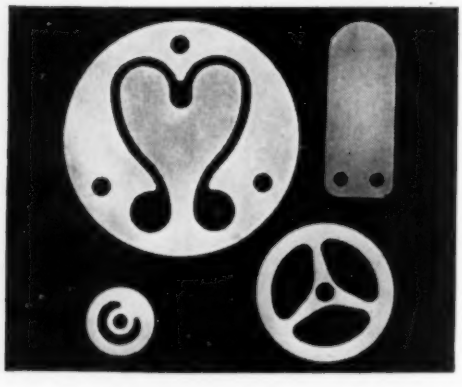

Roto-Finish CASE HISTORY

**PART: Refrigeration compressor flapper valves. • MATERIAL: Swedish steel. OPERATIONS PERFORMED: Deburr. Generate full radii on all edges. Remove stress risers. • RESULT: Fatigue resistance increased 500%.**

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## News of Metalworking . . .

### Republic to Hire 1000 for Jet Work

FARMINGDALE, N.Y. May 6: Republic Aviation Corp. announced that it expected to hire more than 1,000 employees during May. Muddy I. Peale, President of the jet aircraft builder, said this increase reflected the company's buildup for volume production of the supersonic F-105 fighter-bomber later this year. •

### Carborundum Unit May Leave Niagara Falls If Union Rejects Pact

NIAGARA FALLS: Clinton F. Robinson, President of Carborundum Co., in a speech at a union meeting, said the company's biggest division may leave Niagara Falls if the Chemical Workers' Union rejects a new contract on management's terms. He further remarked that the company was considering Van Wert, Ohio, for the new Bonded Products division plant.

The company's three-year contract with the union expires July 19. If the union agrees to the company's proposals, including no wage increase except a cost-of-living adjustment, Carborundum probably will build a $10 million plant in Niagara Falls to replace the old one, Robinson stated. •

### Solar Aircraft Builds Airborne Generator Sets for the Air Force

SAN DIEGO: Solar Aircraft Co. announced a new $3,000,000 contract from the Air Force to build gas turbine powered airborne generator sets for the KC-135 jet tanker. Additional orders for spare engines and parts are expected at a later date.

Powered by Solar's Mars gas turbine, the auxiliary generators will be the first built by Solar to be supplied with heat exchangers to utilize exhaust heat for cabin heating. Initial delivery of the units is slated for late this year.

The generators are used to provide extra electrical power during take-off and landing and to operate a variety of electrical mechanisms, both in flight and on the ground when the main engines of the aircraft are off. •

Fast work . . . roughing the box ends of 1½" combination wrenches with 50-X RESINALL METALITE "91" Coat Cloth Belt.

# Cuts "roughing" time in half!

Here's the newest, roughest, toughest, fastest-working abrasive for the metalworking industry — "91" Coat RESINALL METALITE Cloth. It's the answer to your demand for more production plus more mileage. And a "91" Coat Abrasive Belt cuts faster.

Prove it on your toughest job in your own plant or at your nearest "Abrasive Tech" Methods Room — ask for a demonstration.

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BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes
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# Letter From Washington

By **D. M. Carlson** . . . . July 1958

**Broad labor reform bill is approved by Senate. House action is doubtful.**

● A broad labor reform bill has been overwhelmingly approved by the Senate (88-1) and sent to the House, but it is not likely to be accepted there so readily. The measure is aimed chiefly at curbing thefts of union funds and safeguarding the rights of union members. Administration proposals to add stiffer provisions, keeping the bill more in line with what President Eisenhower had recommended, were voted down by the Senate. Its final form was gained and accepted after some 46 amendments had been discussed and rejected. Although members of the House Labor Committee, if left to their own devices, would probably shelve the measure, House Democratic leaders might bring heavy pressure on them to act on the bill for political reasons. Along with Senate Democratic leaders, they feel that failure of Congress to pass labor legislation will give the Republicans fuel for their campaign this fall. On the other hand, some lawmakers are reluctant to take a definite stand on a sensitive issue such as this in an election year, and this factor might serve to work against action in the House.

**Federal debt ceiling may go still higher before Congress adjourns.**

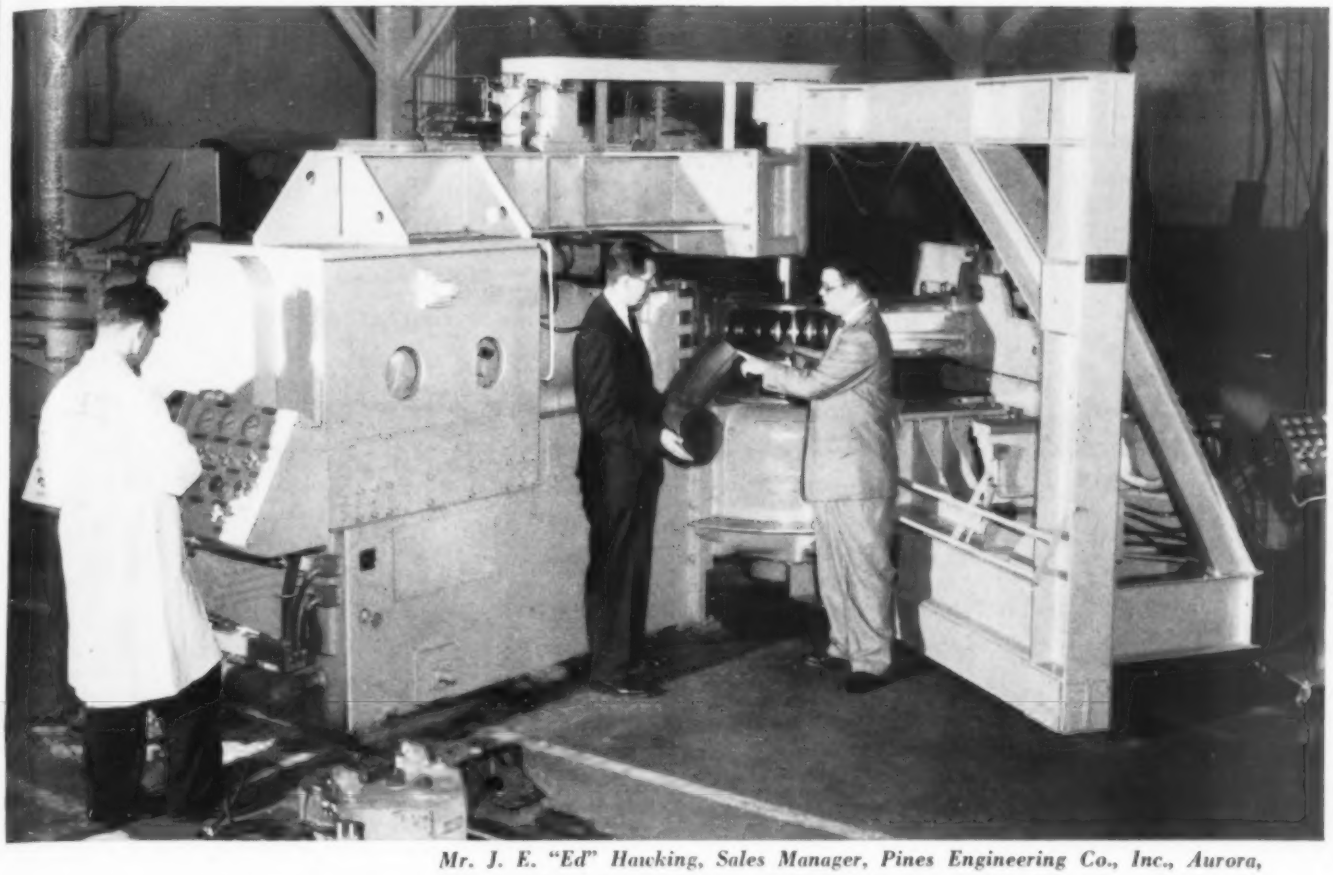
● The Federal debt ceiling will probably be raised again before the current session of Congress adjourns. Earlier this year the ceiling was elevated $5 billion, from $275 billion to its present level of $280 billion. Chairman Mills of the House Ways and Means committee estimates that a liability of $285 billion would be required to cover the deficit financing expected during the remainder of 1958 and the early months of next year.

**Combined land, sea and air forces would eliminate needless duplication, provide unified defense, says U.S. Chamber of Commerce.**

● Defense takes two out of three of your federal tax dollars. According to the U.S. Chamber of Commerce, modern weapons make obsolete the traditional roles of separate land, sea and air forces. That's why the President's recommendations embodied in the defense reorganization bill under consideration in Congress are vital to both government economy and national security, the Chamber maintains. "They would go far toward eliminating needless duplication and providing unified defense."

**U.S. Supreme Court rules non-striking employee may sue union for all damages.**

● A recent U.S. Supreme Court decision may serve to prevent mass picketing and similar activities directed at non-strikers in labor disputes. In the case of UAW v. Russell, the Supreme Court upheld a state court award of $10,000 in damages to an employee who sued the union because he was forcibly prevented from working during a strike. State law permitting, non-strikers were thereby granted the privilege of suing a labor union in a state court and could possibly recover all damages, including lost wages, mental anguish, and even penalties levied against them for breaking the strike.



*Mr. J. E. "Ed" Hawking, Sales Manager, Pines Engineering Co., Inc., Aurora, Illinois (right) is explaining to Bob Bolinder, one of the "Men from Hitchcock" how this giant Pines Bender is able to produce bent sections of thinwall tubing. This unit is the largest of its type ever produced and offers more new and improved design features than have ever appeared before on a machine of this kind.*

# THE MAN FROM HITCHCOCK

The desire to keep abreast of the latest machinery developments for the metalworking industry, guided Bob Bolinder to the Pines Engineering Co., to learn more about the giant Pines Bender shown above. This new unit, designed and manufactured by Pines for one of the nation's largest aircraft manufacturers, is a hydraulically operated machine that, for the first time, makes possible the bending of ultra-thin 8" O.D. x .020" stainless steel tubing. It provides a means for producing large bent sections for stronger, better quality tube components used in the air and fuel ducting of jet aircraft.

Digging into what is happening today and finding out what is planned for tomorrow, plus the clear, concise reporting of these events and developments, has created a continuing reader interest in Hitchcock publications that is outstanding. Readers in the metalworking, woodworking and mass transportation industries know they can look to their respective Hitchcock publications for up-to-date reporting on the latest news, developments and trends, plus editorial feature articles that accurately interpret these developments into everyday applications. Talk to *your* "Man from Hitchcock" to find out how this Hitchcock editorial-readership atmosphere helps to put across your sales-story to the prime buyers in your particular market.

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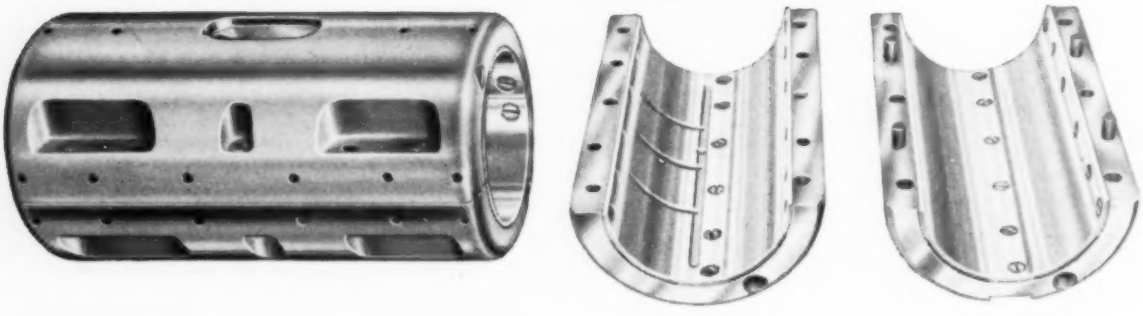
THE PIONEER OF CONTROLLED CIRCULATION

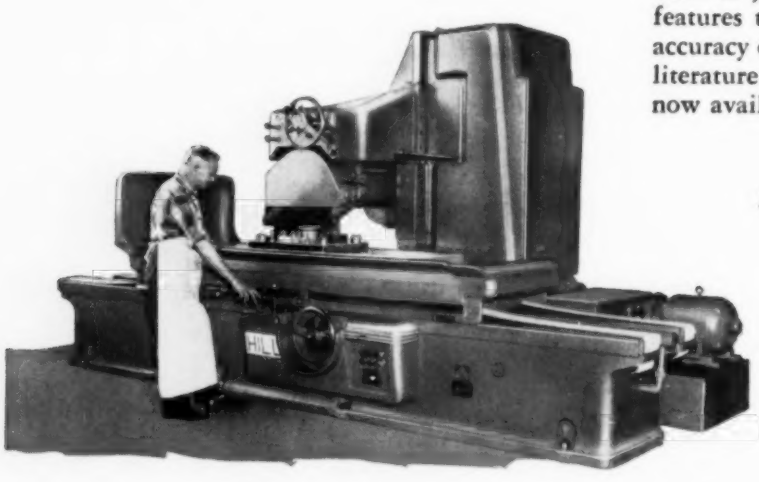
# Novel Design provides *Astonishing Bearing Life*

The life of the HILL front spindle bearing on HILL horizontal spindle hydraulic surface grinders is truly astonishing. This bearing has been an *exclusive* HILL feature for more than 15 years. The necessity of replacement, under constant use, is practically unknown.



The front spindle bearing on HILL horizontal spindle hydraulic surface grinders was engineered by the HILL ACME COMPANY and has proven in the field to operate indefinitely. An alloy bronze bushing is fastened to a semi-steel casting with brass screws. The bronze bushing is undercut lengthwise in four equidistant locations on the outside diameter to allow for spindle expansion. (Darker areas in photo show undercut sections.) A perfect bearing surface is established in the I.D. of the bronze directly opposite the undercut sections. Oil is forced into specially designed concave relief areas which act as oil wedges assuring long bearing life. Hardened dowel pins guide the two halves together to their original position. The bottom half of the bearing has an oil return slot shown at the edge of the half section on the outside diameter. Note that there are NO oil grooves in this bottom half or in the quarter half of the top section. The shaft rotation spreads the oil film from the oil distribution grooves to the perfect bearing surfaces. Any additional oil grooves would act as scrapers and be detrimental to the oil film formed around the spindle.

This is just one of the many exclusive construction features that result in the longer life and permanent accuracy of HILL heavy duty surface grinders. Detailed literature on these high-precision machine tools is now available.



*24" x 24" x 72" HILL horizontal spindle surface grinder grinding blanking dies to extremely close tolerances. Also built in Vertical Spindle design.*

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# EDITOR'S PAGE

## SALES FIRST

Under present conditions it seems the most emphasis is being put on savings. The banks tell us they have never been so busy. Yet, almost every company talks about cutting down and saving. What about selling? If we have so much in savings selling should be easy.

It appears business is doing something about the present conditions. But, is it going in the right direction? Should advertising, sales, travel, etc. be cut? Doesn't this decrease the ability to sell and therefore decrease the possible savings?

We have recently attended a show which proves our point. The Coated Abrasive Machinery Show at the Behr-Manning plant is an example of a sales first approach. Without cutting advertising or sales expenses they have presented an outstanding show. The attendance which far exceeded the past two shows proves there is an interest in buying or considering purchase of new equipment.

Those companies who displayed their products also are an example of the sales first attitude. Their participation definitely helped to assure the success of the show. Even more important, these companies had new equipment and machines at the show. They had not cut back, they were spending to develop new processes and equipment. They were spending to attend the show and for the research and development of the products they were showing. These companies are designing and building new products to sell. They are participating in shows to sell.

The companies who were interested in sending their representatives proved the point from the other side. Their large attendance indicates that they are still buying. These companies were spending in anticipation of purchasing equipment on display.

All three groups are looking forward. Their advertising sales and development work is for the future. This is the sales first thinking which makes leaders.

W. W. Patterson

MANAGING EDITOR

JULY, 1958

# Grinding at New Timken Bearing Plant

- ***New innovations in automation.***
- ***Automatic gaging on all grinding operations and at the end of each line.***

by **M. M. Patterson**
Managing Editor

• A new railway bearing plant in Columbus, Ohio, built by The Timken Roller Bearing Company at a cost of over $7 million, is capable of producing 20,000 car sets (160,000 units) of its Heavy Duty "Type AP" bearing annually. The investment was made by the company for the purpose of tapping the huge potential of railroad rolling stock still running on plain friction bearings.

The Timken Company has found through experience that highly mechanical lines of the type built in Columbus, although representing a sizable expenditure, reduce the cost of the product to the consumer. The actual price of a set of bearings has remained from $600 to $800, but the increase in the cost of a railroad car has jumped to the $8,000–$10,000 range. Timken bearings represent a decreasing percentage in the total cost of the car.

The decision to build the new plant was made in November, 1955, but more than thirty years of research, development and operating experience preceded its construction. The railway production line is divided into four basic units: green machining, heat treating, grinding and finishng. A total of 26 men per shift handle all production. Five different sizes of the AP bearing are produced with the O.D. of the cup ranging from 9-15/16" to 6-½" and length 7-¼" to 4½".

The grinding department, divided into three machine lines of roller, cone and cup grinding, cost $2,392,000. For each shift two men are needed on the roller line, three on the cone line and three on the cup line.

Before equipment was installed at Columbus, cup and cone grinding lines complete with handling equipment, were set up at the machine tool manufacturer's plant and used to grind product. Purpose of this testing was to iron out all major "bugs" before use at Columbus. The roller line was set up and tested at the Timken Company's Research and Development plant in Canton. When testing was completed, the lines were dismantled by sections and sent to Columbus for installation. Machines were either designed by the Timken Company or are standard design machines altered to fit particular applications.

Each machine in the three grinding lines is equipped with automatic compensation for wheel wear. When in-process and other gages indicate wheel breakdown adjustment is automatic. Grinding wheels are diamond dressed automatically. Dressing of wheels varies from once after every grind to periodic dressings.

Another interesting device, designed mainly to protect quality of the product and tooling, is the coolant pressure switch on each machine. If coolant pressure should drop, due to a pump failure or a plugged coolant line, the switch shuts off the machine before any damage can result.

Production in the plant is geared to produce 30 complete and assembled bearings an hour. Machine lines and grinding cycles in the grinding department were "set up" with this goal in mind.

To see how these new, automatic grinding lines operate, we will cover, step-by-step, the entire operation.

## ROLLER GRINDING LINE

Rollers are pre-formed in a cold forging operation, heat treated and surface cleaned by tumbling in an abrasive before arriving at the grinding department in pans. Basically the rollers require six grinding operations to finish the two ends and the outside diameters.

In the first operation rollers have their outside diameter ground on a Cincinnati No. 3 centerless grinder. Rollers are loaded into a floor hopper and lifted by a spiral conveyor to a turning mechanism that positions pieces with the small end toward the machine. A chain conveyor feeds the rollers into a regulating wheel that holds the product against the grinding wheel. The regulating wheel has a spiral track that smoothly and evenly moves rollers across the grinding wheel. This is the first of four passes and about .010 inches of stock is removed from the outside diameter at the rate of 38 rollers per minute. Following grinding, every tenth roller is checked for size automatically by an electrical gage maintaining a tolerance of .001 inch.

The grinding wheel is 24" x 10" x 12", 2A-80-K5-VN. Surface speed of grinding wheels on all Cincinnati

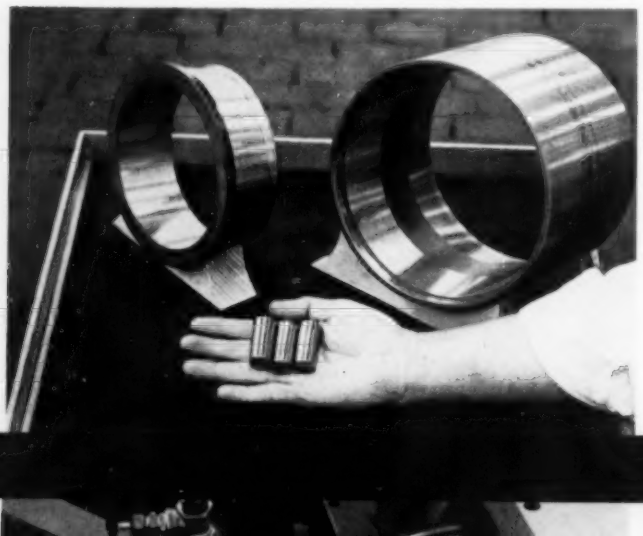
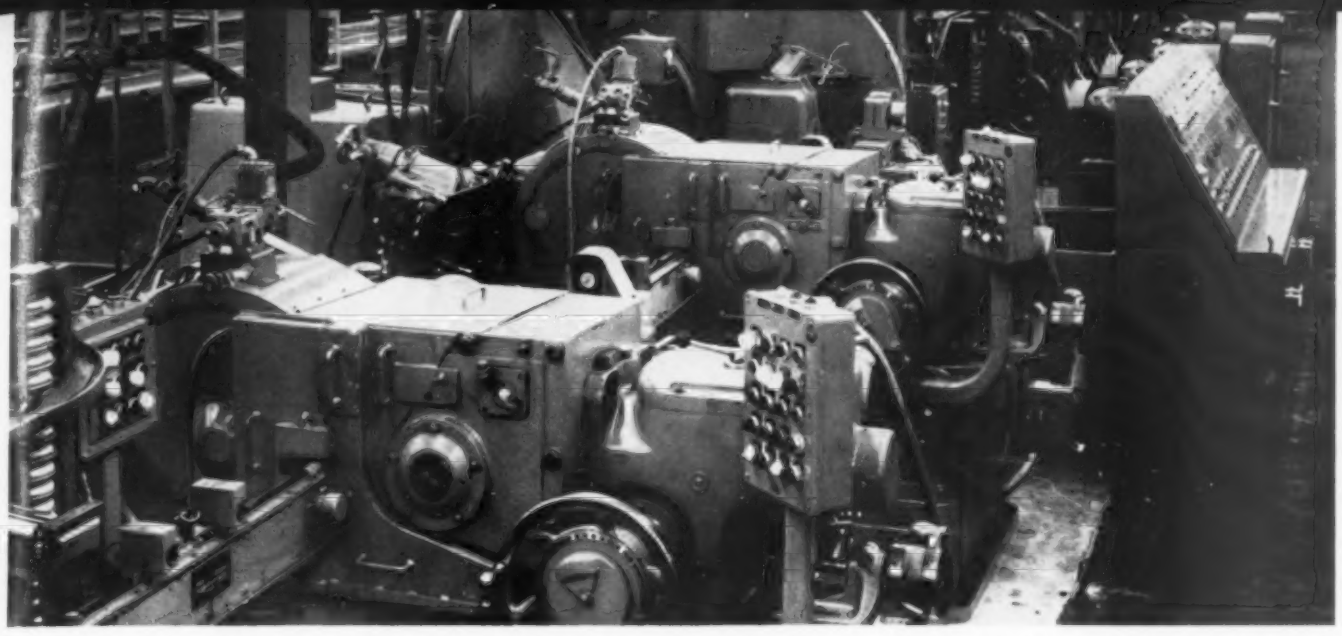


*Photo shows the three different parts being ground in the Grinding Department. In the foreground are some rollers, in the background to the left is the cone and in the background to the right is the double cup.*



*A spiral elevator lifts rollers from floor level hopper into the Cincinnati No. 3 Centerless roller grinder at the rate of 38 per minute for the "first pass." The tapered surfaces of the rollers will have approximately .010" of stock removed during this first grinding operation. Six separate grinding operations are needed to finish all surfaces of the rollers. Machines are automatically loaded with conveyors which are exactly timed to proper sequence. In the background a monitor panel indicates the operating status of each machine.*

No. 3 grinders in this line is kept within a range of 6500 to 5200 SFM. The second pass operation is identical to the first grinding, that is, .010 inches of stock is removed from the outside diameter of the roller in a Cincinnati No. 3 Centerless Grinder.

Rollers leave the "second pass" on a chain conveyor to the spider feed of the 84B Gardner Grinder. Both ends of the roller are ground simultaneously. The amount of stock removed from the small end is .0125 and .0085 is ground from the large end. The large end will be given one more grind on the spherical end grinders to give it the proper spherical shape.

Grinding wheel for the small end of the roller is 36" x 2" x 13", A100-M-11-BW. The large end requires the same size wheel, but is a 81A-80-G11-BW. Production rate is 38 per minute. Rollers are ejected from the circular carrier by an air jet into the conveyor system for the fourth operation in the spherical end grinders.

Four of these Timken designed and built machines maintain the production rate of 38 per minute. Each machine grinds a spherical surface on the large end of the roller at the rate of 12-13 a minute. A special 2" x 1-¾" x 1-½", A-280-K8-B5 grinding wheel removes .004 inches of stock. The new grinding wheel is shaped by the piece it is grinding. Every time a new wheel is placed into the machine, several rollers are ground before the wheel has the correct profile.

Rollers feed to the spherical end grinders as machine conveyors become empty. If the first machine in the line is full, proximity switches shut the gate on the machine feeder chute and the roller passes on to one of the next three. From this point to final assembly rollers will be kept in the sequence that they are ground.

The fifth operation is the "third pass" on the outside diameter of the roller on a No. 3 Cincinnati Centerless Grinder, again removing .003 of stock while maintaining a tolerance of .001 inches. The production rate is 38 parts per minute. The grinding wheel is 2A-80-K5-VN.

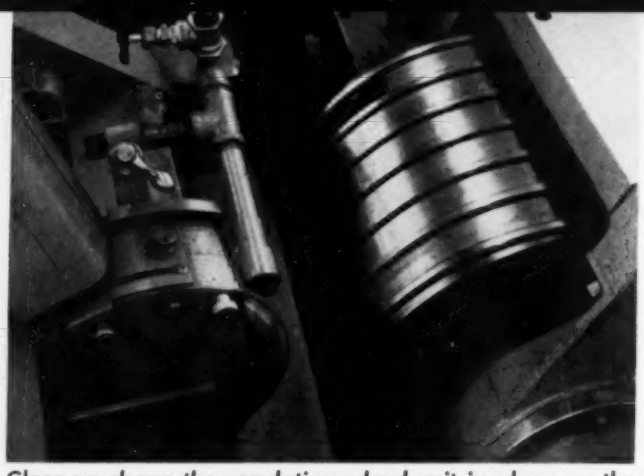
The last grinding operation for rollers is the "fourth pass" on a No. 3 Cincinnati Centerless Grinder using mineral seal oil as a coolant. The amount of stock removed is .0015 inches. An electronic amplifier sizes every tenth roller following this last operation within a tolerance of .00025. Rollers undersize or oversize are rejected to separate pans by the gage. Maintaining this sequence is an important "extra" providing greater accuracy in every bearing made. Finished tolerance on rollers is very close, within a range of millionths of an inch. The Timken Company has found from experience that rollers in sequence vary probably no more than a few millionths of an inch from roller to roller, thus distributing what little variation there is evenly over the full set of rollers.

Finished rollers receive one last operation on this line. A surface inspection machine, using a photoelectric cell, detects blemishes on the outside diameter of the roller that are often too small for the human eye to detect. If defective the roller is rejected.

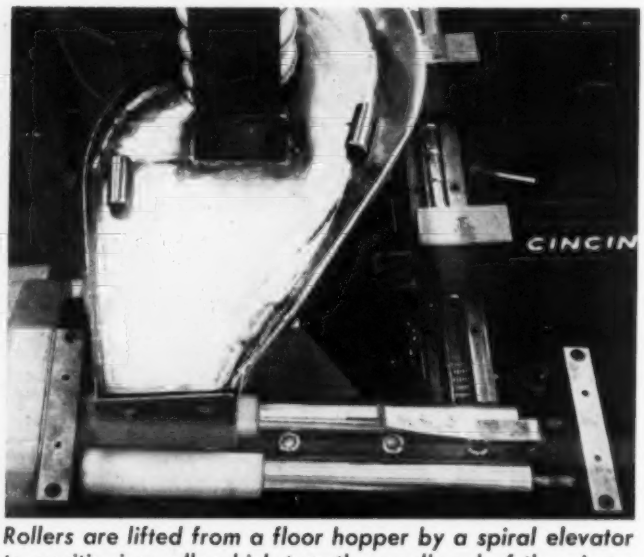
Inspected rollers are stored by sets in sequence in tubes holding from 21 to 24 rollers corresponding to the number required for cone assembly until needed for final assembly.

A central coolant system supplies all machines in the roller line, except for the "fourth pass", with a six per cent soluble oil to water solution. The last grinding machine in the line uses mineral seal oil from a separate system. A precipitron prevents oil mist from escaping into the work area and built-in $CO_2$ fire extinguishers reduce the fire hazard.

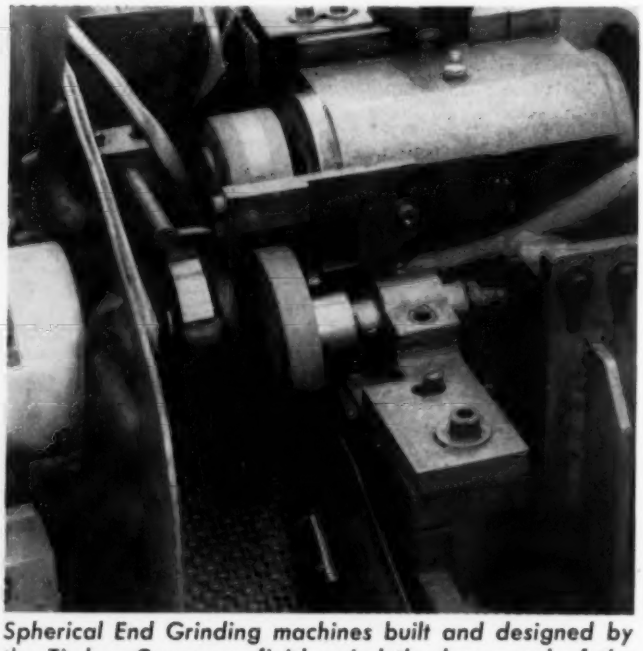
A unique machine developed by the Timken Company on the roller line is a modified No. 3 Cincinnati Centerless Grinder used to recondition the regulating wheels for the four production Cincinnati grinders. The entire regulating wheel housing is mounted on this auxiliary machine for reconditioning. When reconditioning work is finished, the unit can be placed into the production machines with no further adjustment. Spare units are kept on hand making it unnecessary to wait until the regulating wheel has been ground



*Close-up shows the regulating wheel unit in place on the modified No. 3 Cincinnati Centerless for reconditioning. The Machine is located at the head of the roller grinding line.*




*Rollers are lifted from a floor hopper by a spiral elevator to positioning rolls which turn the small end of the pieces toward the machine. The machine is the "first pass" No. 3 Cincinnati Centerless Grinder, the first grinding operation on the roller line.*



*Spherical End Grinding machines built and designed by the Timken Company, finish grind the large end of the rollers in the fourth operation. A close-up view of the machine with its cover removed shows the rolls holding rollers in place and the special grinding wheel.*

to resume production on that machine. Maintenance cost is reduced and lengthy interruptions of production avoided.

Since only two men attend the roller grinding line, a system of overhead signal lights, called visualometers, were devised to show the operating status of each machine. Three lights over each machine tell the attendants the story: red if the machine is down and needs attention; amber indicates that the machine is waiting for stock or a subsequent machine in the line; and green shows that everything is as it should be.

In addition to the visualometers, centralized monitor panels show the same type of information, but in greater detail. An attendant can look at the panel and tell just where he is needed. Recorded, too, is the number of wheel dressings each grinding wheel has received.

Proximity switches located at different points on the conveyor system control the flow of rollers. Should any operation in the line stop, the system of switches will in a few minutes time stop in sequence all machines.

**CONE GRINDING LINE**

Heat treated cones are brought by pallet to the cone grinding line and loaded manually onto the conveyor system through a demagnetizer. Once on the conveyor pieces will be handled mechanically during all eight grinding operations except where cones are pulled for inspection purposes. Microswitches are used on the conveyor system of the cup and cone lines. Where magnetic chucks are required to hold product, the piece must pass through a demagnetizer as it leaves the machine.

On the cup and cone lines parts are washed following every grinding operation. The purpose of this is two-fold. Cups and cones are cleaned of grinding sludge, and are cooled to around room temperature providing more accurate gaging for each operation.

In the first operation a 2H30 Gardner Grinder grinds the front and back faces of the cone. A reciprocating carrier moves pieces between the two wheels. A uniform pattern or "good commercial" finish is sought at this point. The wheel removing .010 from the back face is 30" x 3" x 16", and has a grit and grade of 81A-80-G-10BWDCM. The front face has .012 of stock removed with a wheel of the same dimension, but with a grit and grade of 81A-100-M10BWSF. An air orifice in the machine controls the length of the cone.

Coolant for both the cup and cone lines is circulated by central system supplying a three per cent soluble oil to water solution.

The rough bore of the cone is ground by a No. 291 Heald Centrimatic in the second operation. The piece is held in place by a magnetic chuck and an in-process gage controls the grinder in removing the correct amount of stock. On other machines centerless grinding principles are used. Once faces are ground they are supported by micro-centric shoes and aligned by the ground back face. Size of the grinding wheel varies with the part number being ground and is a 32A-70-146-VBE.

The third operation consists of rough grinding the cone raceway and finish grinding the small rib on a No. 2 Microcentric Cincinnati Grinder. Two of the machines are needed at this point to maintain the pro-

duction rate. The amount of stock removed from the raceway diameter is .020 to .022 inches. Wheel size is 20″ x 2½″ x 15″ with the width varying to 2″ depending upon size of cone being run. Grit and grade is 2A-60-L6-VL.

The fourth operation rough grinds the large rib radius, the angle of the rib and the relief. Stock removed is .010 to .012 inches. Finish again is a "good commercial" with the wheel 20″ x ⅜″ x 15″, A60-A5-VBE. The profile of the wheel is preformed by the wheel manufacturer and profile dressed periodically during grinding operations.

A No. 2 Microcentric Cincinnati finish grinds the rib in the fifth operation at the rate of one a minute. In-process gaging is not used on this machine since the amount of stock removed, .0015 inches, is slight. Instead, grinding is controlled by a positive stop. A surface finish of 18 microinches is maintained. Tolerance of the diameter of the work piece is under .0005 inches. The wheel used here is a A-80-K5VBE–20″ x ⅜″ x 15″ preformed profile.

The bore of the cone is finish ground in the sixth operation on a 291 Heald Centrimatic Internal Grinder. About .006 inches of stock is removed (.003 on a side) with a surface finish under 50 microinches. The tolerance of the inside diameter is kept under .001 inches. The grinding wheel is 32A-80-L6-VBE.

The raceway of the cone is finish ground in the seventh operation on a No. 2 Microcentric Cincinnati. The surface finish is under 25 microinches. The amount of stock removed is .0025 to .003 inches with the tolerance of the taper kept to plus or minus .00025. This wheel is an A-80-L6-VL. A roving inspector makes periodic inspections checking the race diameter, race taper and the surface finish.

The last machine operation on the cone grinding line, the eighth, is completed by a No. 291 Heald using an adaption for abrasive tape which polishes the radii of the cone bore. Coolant for this machine is a mineral seal oil. Purpose of the operation is to protect against any possibility of a sharp edge at the junction point of the radius and the bore. This prevents possible scoring of axle surface when the bearing is being installed. The abrasive belt has a 220 grit E grade. The surfaces of the cones are visually inspected and all dimensions are checked on air gages.

As in the roller grinding line visualometers and monitor panels indicate the operating status of each machine to the three operators attending the cone line.

**CUP GRINDING LINE**

Heat treated cups are loaded manually on the conveyor system first passing through a demagnetizer. The conveyor system provides automatic handling and positioning of cups between operations. It is designed to prevent damage to the heavy cups through contact and provides a 30 minute storage of parts between operations.

All cup grinding machines are equipped with gages which give in-process control at each operation. Gages are provided at each station for quality control checks by roving inspectors. Eight grinding operations will complete the cups.

The first machine in line is a No. 4 Cincinnati Centerless Grinder that plunge grinds the outside diameter

*At the photo-electric surface inspection machine finish ground rollers revolve in a light beam which detects surface defects such as nicks or scratches. The machine is capable of inspecting 48 rollers a minute. All handling is done mechanically.*

of the two or more cups at a time. While grinding takes place the feeder system groups additional cups for the next cycle. The feeding system on this grinder merits some attention. The new grinding cycle is started by the rapid approach of the regulating wheel. When the grinding load begins to increase, a surge switch reduces the rate of approach to a "fast feed." At this point in the cycle an "Air Gage Caliper" takes over control. When the air gage indicates that about .005 inches of stock is yet to be removed, all approach of the slide is stopped for one minute. At the end of this dwell, the wheel is dressed and the approach continues, but at a very slow rate called "slow feed." Before reaching final size, another dwell occurs and when the air gage indicates final size, the slide retracts and finished cups are pushed out by the three unground cups.

The amount of stock removed is .030 inches and a finish of under 100 microinches is obtained. Cycle time for the three cups is about six minutes. Grinding wheel is 24″ x 20″ x 12″, 57A-60-J6-VBE. A washing operation follows each grinding operation serving the same purpose as on the cone line.

Following the first operation cups are handled one at a time. The second operation is completed in the 2H30 Gardner Grinder where the front and back faces of the cup are ground simultaneously. About .010 inches is removed from the front face and the same amount from the back face. The length of the cup is controlled by an in-process air gage. A uniform finish is maintained at this stage and the tolerance of the length is a plus or minus .002. The wheels are the same, 30″ x 3″ x 18″, 81A-80-G11-BWDCM.

*A No. 291 Heald Centrimatic using a special tape adaption is used in the last operation on the cone line to polish the cone bore radii. Coolant used is a mineral seal oil. Built in $CO_2$ fire extinguishers lower the fire hazard.*

The third operation, the rough grind of the raceway surfaces, is done by a No. 291 Heald Centrimatic.

The amount of stock removed is .014 inches on the diameter and air gaging during the operation assures proper size and taper. Grinding wheel is a 32A-70-M6-VBE and dimension varies with the part number being ground. The finish obtained is approximately 50 to 60 microinches.

A mechanism on the conveyor turns the cups end for end following the third grinding operation. These are double cups and have two race surfaces. The fourth operation is identical to the third except the raceway on the opposite end of the cup is rough ground. Grinding operations three and four remove most of the I.D. stock leaving a minimum amount to be ground during the finish operation.

Track grinding, the fifth grinding of cups, is done for the purpose of providing a smooth round surface to work from during finish grinds. A one inch wide surface equi-distant from the ends of the cup, is ground on the outside diameter. Roundness is held to a .0001" T.I.R. and the surface finish is held under 40 microinches. Maximum taper permitted on this surface is .0003. The diameter is held to .0005 for size. The machine is a No. 2 Cincinnati Microcentric O.D. grinder with a cycle time of two minutes. The grinding wheel, a 20" x 1" x 5", 2A-80-I6-DL, removes about .008 inches of stock.

A No. 291 Heald Centrimatic Internal Grinder finish grinds both counterbores simultaneously in cycle time of two minutes. Counterbores provide an accurate surface for the grease seals pressed in during final assembly of the AP bearing. About .020 inches is removed from the diameter of the counterbore with a tolerance under .001 inches. The grinding wheel used is a 32A-80-L6-VBE, 5½"x½"x3".

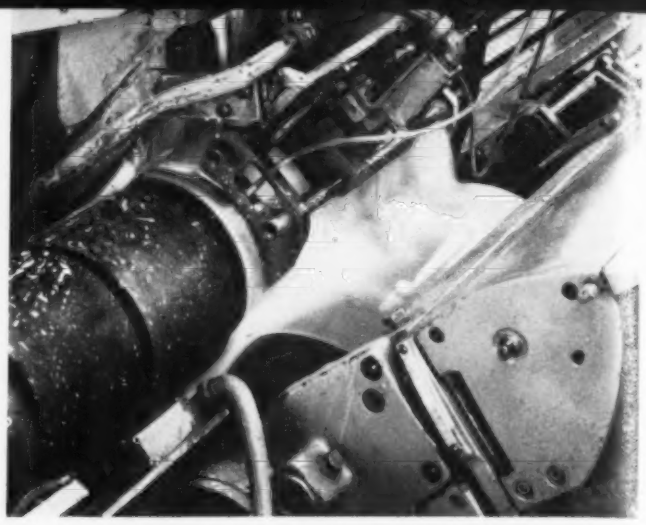
Operations seven and eight finish grind the cup race surfaces. The angle of the tapered raceway surface, and the diameter of the raceway must be highly accurate. The surface finish must be extremely good and the concentricity of the raceways and counterbores to each other must be exact. The machines used are No. 291 Heald Centrimatic Internal Grinders, one for each of the two cup raceways. The wheels used are 32A-80-L6-VBE. The amount of stock removed is .006" on the diameter.

Finished cups are washed in a mineral seal oil and given a 100% visual inspection. An air gage next gages for length, diameter of both raceways, race angles of both ends and the counterbore diameters simultaneously. Counterbore depth and counterbore groove depth are checked on a dial indicator.

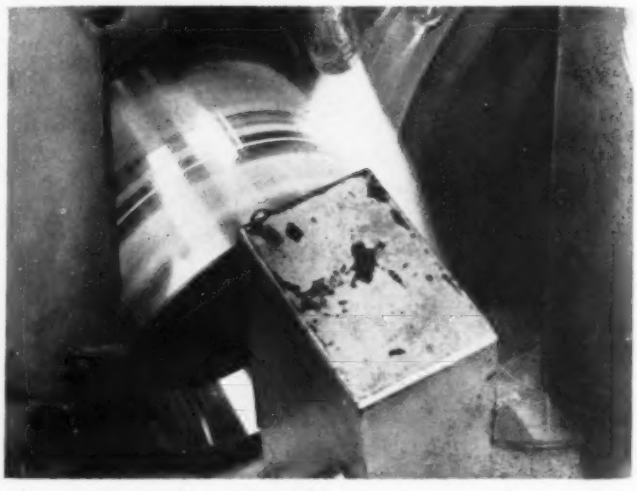
Again as on the roller and cone lines, visualometers and monitor panels provide machine operators with an easy reference for machine operating status.

Following grinding cups and cones are automatically phosphated and assembled with rollers and cages and "run in" under load. At final assembly one cup and two cones are assembled with a spacer, greased and grease seals pressed into the cup. Seal wear rings, cone backing rings, and axle end caps are banded to the assembly and the assembly placed in a sealed box.

• • •

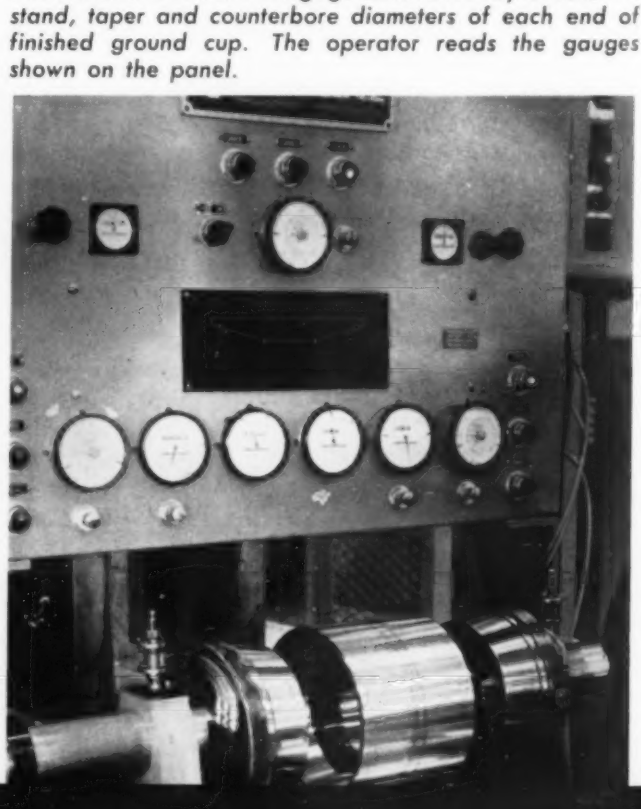


*Close-up shows the No. 4 Cincinnati Centerless grinder plunge cut the outside diameter of three cups simultaneously. Three cups are in the process of grinding and three cups are waiting to be moved into grinding position.*



*Close-up view shows the fifth operation on the cup line where a No. 2 Cincinnati Microcentric grinds a one inch track on the outside diameter of the cup equidistant from the ends. This provides an accurate surface to work from during finish grinds.*

*The Federal automatic air-gage simultaneously checks the stand, taper and counterbore diameters of each end of finished ground cup. The operator reads the gauges shown on the panel.*



# THE 3rd COATED ABRASIVE MACHINERY SHOW

√ *2097 attend representing 1594 companies*

√ *Over 50 builders represented*

√ *New machinery developments revealed*

## The Place

*The new Product Engineering building which housed the 3rd Coated Abrasive Machinery Show.*

• TROY, N.Y.: On June 9 Governor Harriman officially opened the million dollar Product Engineering building of the Behr-Manning Co. a division of Norton Co. This was the prelude to the show which was to be held in the building during the following four days. During these four days 2097 individuals observed equipment displayed by 50 builders and purchased 9 machines from the floor. Those in attendance saw new machines and developments in operation which were being shown for the first time.

In addition to observing the machines in the various booths the visitors were invited to take a tour of the plant in special motorized equipment which

→

*The show was attended by 2097 men from industry, representing 1594 companies.*

## The Opening

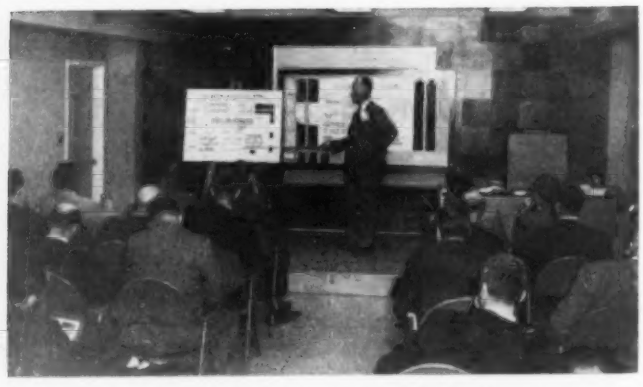
*Official opening of the show and of the new Product Engineering building. Left to right: Dirck J. Olton, manager, product engineering; Milton P. Higgins, president of Norton Company; Governor W. Averell Harriman; Elmer C. Schacht, president of Behr-Manning Company and Mayor John J. Purcell of Troy, N. Y.*

## The Attendance

## The Tour

*Nearly 1400 show visitors also enjoyed a motorized tour of the abrasive plant.*

## The Education



*During the week 482 visitors attended "Abrasive Tech" lectures by Dr. Hugh N. Dyer, assistant manager of product engineering.*

## The Machines

*Above, centerless belt grinder is capable of heavy stock removal. Below, 150-hp belt grinder, using an abrasive belt 50 in. wide, is shown mechanically descaling steel sheet. This heavy-duty equipment can operate the grinding belt at speeds up to 6000 surface feet per minute, flooding the work-point with coolant pumped at 300 gallons per minute.*

*(continued)*

moved in and around the actual production area. Nearly 1400 took advantage of the invitation.

Still another side light at the show was the "Abrasive Tech." This was a lecture by Dr. Hugh N. Dyer on coated abrasives. This lecture was held several times a day during the show. The lecture covered the backings, bonds, abrasives and other elements that affect coated abrasive operations. These lectures were attended by 482 individuals.

The equipment on display was as diversified as the abrasive industry itself. Processes in action included automatics, centerless, contour polishers, conveyorized automatics, die polishers, extrusion polishers, internal grinders, offhand polishers, pedestal grinders, platen grinders, roll grinders, sheet, strip, coil, bar grinders, swing frame grinders, tongue-yoke grinders, tube polishers, backstand idlers, bench grinders, disc grinders, drum sanders, portable tools, wheels, exhaust systems, filters, cutting oils, dust collectors, and attachments.

In a room adjoining the main display area a model abrasive belt storage room was setup. This room not only acted as a display for the show, but, also provided ideal storage facilities for the coated abrasives being used on the operations in process on the floor.

Some of the machines on display have been purchased by Behr-Manning and will be permanent equipment in the new building. The acquisition being part of their program of product engineering. New coated abrasives and uses for coated abrasives will be tried and developed through the use of these machines.

The new machines and uses shown were too numerous to cover in this issue, however, there are several which should be mentioned. A 50" wide belt grinder for mechanical descaling and heavy stock removal is still in the testing stage, but, with its 150 hp motor and beefed up construction definitely was an example of the progress revealed at this show. The centerless machines shown received and deserved a great deal of attention. Automatics also show an advancement in the line of buffing and polishing.

On hand all during the show were many Behr-Manning personnel who very ably assisted those attending with any particular problem or introduction to booth personnel to answer detailed problems on the equipment. This personal attention for the visitor did much to make the show more profitable to all concerned. • • •

***Watch for the August issue of GRINDING AND FINISHING for detailed report on the machines at this show. All the outstanding equipment displayed will be reviewed.***

# Electronic Gaging Updates Old Cylindrical

- Reduces roll grinding time
- Produces more accurate tapers
- Eliminates trial and error regrinding

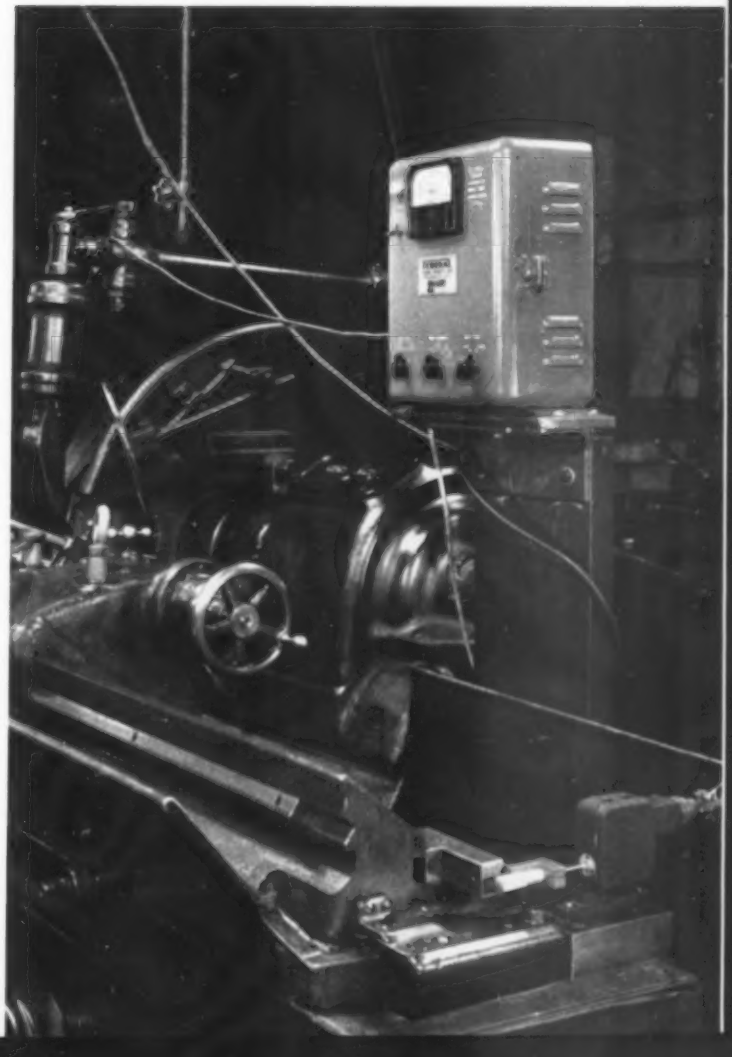
by **Richard L. McKee**
Associate Editor

● The installation of an electronic table positioning gage on a twenty-five year old cylindrical grinder has enabled Ward Steel Company, Boston, Massachusetts, to match the quality requirements of more modern, smaller equipment in regrinding flat and tapered small-diameter high-speed steel rolls used in producing cold rolled spring steel strip.

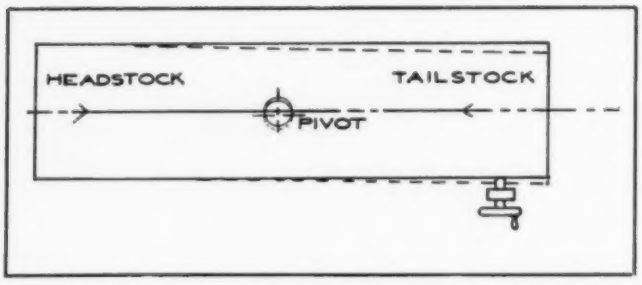
The rolls in question are 24¼" long x 2¼" OD, with an eight-inch working face. The tolerance is plus or minus .0001" on the diameter and the taper, with the tapers on either end to be held within plus or minus .0003" of each other. The amount of taper varies considerably, depending on the application.

As the job was originally done, the taper on one end of the roll would be ground and checked with a micrometer, after which the other end would be ground to match. This usually required several trial and error grindings, and it was almost impossible to achieve uniformity in the tapers. Also, in regrinding the rolls, it was extremely difficult to match the original tapers.

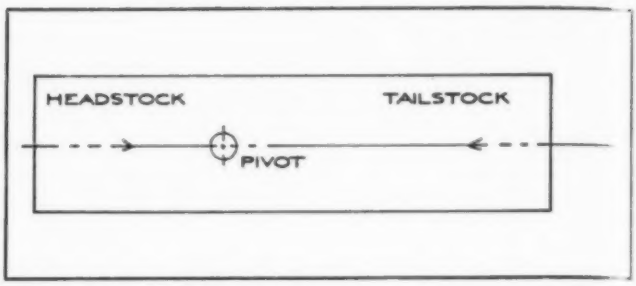
Use of a dial indicator on one end of the table to check grinding to size, and then moving the indicator to the other end and attempting to match



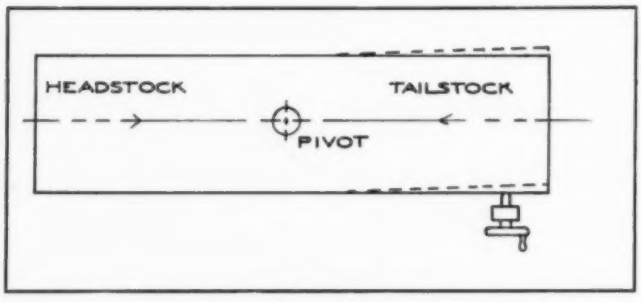
*Federal Sure-Set table positioning gage installed on a Cincinnati grinder. Note the amplifier in the upper right-hand corner of the picture, and the gage head at the lower right.*




*With a loose pivot hole, the table tends to pivot from the heavier headstock end until the hole snubs against the pivot stud.*




*With unequal lengths from pivot to table ends, calibrating resistors are incorporated into electronic circuitry to convert readings into direct diameter changes.*




*Though the pivot is in good shape, stick-slip at the headstock end may cause bending in the table, because the adjustment is made at the light end. When the headstock end does slip, it tends to leap and exceed adjustment, since the tailstock end has been over-adjusted.*

the taper was an improvement, but not satisfactory. Usually it took a minimum of three tries to get a usable roll, and often more than that were required.

The Sure-Set electronic table positioning gage, manufactured by Federal Products Corporation, Providence, Rhode Island, includes two magnetic gage heads mounted at either end of the grinder sliding table and connected to an amplifier containing computing circuitry which automatically corrects for differences between the length of the work and the table. The use of two gage heads also compensates, within limits, for inaccuracies caused by some looseness in the pivot, actual bending of the table, or deflection caused by friction between the swivel table and the sliding table.

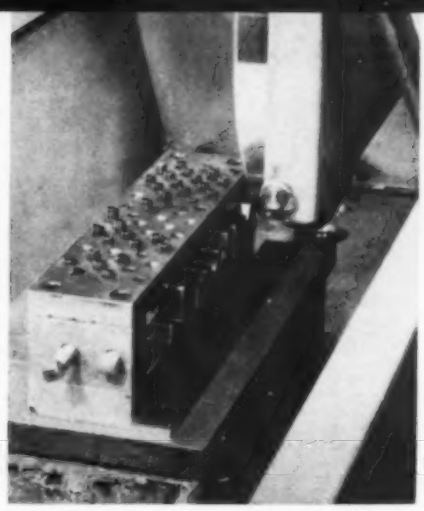
It should be axiomatic, of course, that a machine must be in first-class mechanical condition before the installation of any auxiliary equipment such as this electronic gage. In this case, wear had produced some inaccuracy in the pivot point, and the table would bind at various points as it was turned. Before the Sure-Set was installed, the grinder bed was sent out to be hand scraped, which eliminated high spots and made pivoting more accurate.

The operation of the grinder with the electronic gage is not difficult, but requires care. With the workpiece in position, a trial cut is made to clean up the entire workpiece surface and spark out. After the trial cut, the diameter of the workpiece is measured with a gage having sufficient magnification in relation to the workpiece tolerance. Of course, the workpiece is not removed from the grinder centers during the measuring. Once the measurements have been made and checked, a second trial cut may be taken and the measuring and checking repeated. In many instances this second trial cut is not necessary.

Using this equipment and procedure, Ward Steel Company has reduced grinding time per roll by approximately fifty per cent and has made regrinding the rolls much easier and more accurate. The big advantage, however, according to E. H. Albee, manager of spring steel sales for Ward Steel, is that the greater uniformity achieved, particularly of the tapered rolls, has resulted in a more uniform, and hence a more salable product. • • •

*The gage is shown here in use as the operator switches from one gage head to the other, to adjust the other end of the swivel table.*

*Set up showing the block type fixture with four tools inserted. Fifteen minutes required for this grinding operation.*



*Rounds and squares of carbide shown set up to be ground simultaneously in the same pass.*

*Six hollow end mills (two shown in the cut) are ground at one time and in one pass on the above set up.*

# Electrical Discharge Grinding of Cutting Tools

- *Grinds without contacting the work.*
- *Quicker setups and no clamping distortion.*
- *Saves $300 on each broach form at one plant.*

by **Ping Ianitelli**
Consultant Engineer
Elox Corporation of Michigan

● It is now possible to grind a workpiece without the grinding wheel touching the part. Contrary to conventional practices the electrical discharge machine developed by the Elox Corporation of Michigan is able to grind material with only an economical brass wheel or brass rim as required. The wheel itself is not subject to wear in the usual sense. No contact wear is experienced and no stress is exerted on the part being ground. The only wear that can be experienced by the wheel will be when some of the eroded particles in the workpiece have overcome the mechanical resistance of the dielectric oil. The lack of stress exerted on the part being ground allows quicker setups and eliminates clamping distortion. Magnetic chucks are often sufficient for the job run.

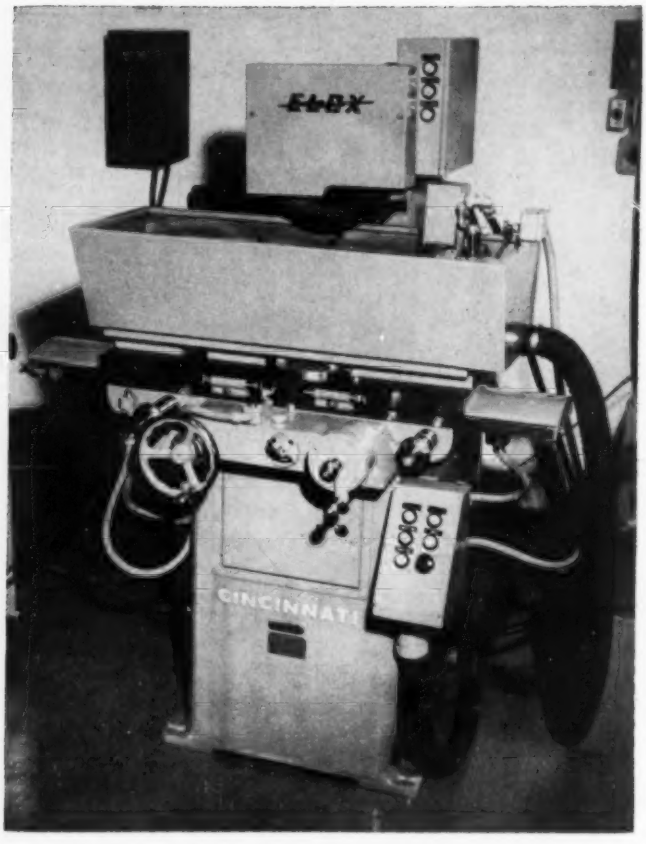
The electrical discharge process grinds various materials with the same ease and facility and therefore is ideal for combination carbide and steel cutting tools. Loading of the wheel as experienced in abrasive grinding does not occur.

The electrical discharge machining is easy to understand. It is a series of electrical discharges occurring at a rate of 20,000 to 300,000 times per second between the tool and the workpiece, the tool acting as the electrode. Simply stated a voltage is gradually built up between the tool and the workpiece until the stress is so great on the electrons crowding the surface of the electrode or tool that they crash through the surface barrier toward the workpiece at nearly the speed of light. These electrons, striking the surface of the workpiece, create ionized atoms which are attracted toward the negatively charged electrode, but are cooled immediately and flushed away by the coolant employed in the process, and by the action of the power supply in alternately "making and breaking" the electrical arc.

At the Aircraft Division of Ford Motor Company, Chicago there is a fine example of the application of electrical discharge machining. The application here was to grind pine tree forms on a special broach. Nearly $300 is saved on each broach form, and nine operations demanded by mechanical grinding procedures were eliminated.

The broach, consisting of 32 carbide teeth, is ground in a 33 minute cycle by the Elox machine. Electrical discharge grinding requires only one roughing and one finishing pass, both the steel and the carbide being ground at the same time. Forming the brass wheel configuration is accomplished by a roughing and finishing form tool located and mounted on the table of the surface grinder. No further operations are performed on the broach, and no diamond wheels are employed, merely inexpensive brass. A tolerance factor of .0002 inches is held in the finished tool.

The finish surface developed by electrical discharge machining consists of relatively uniform sized, evenly spaced, hemispherical cavities, free of heat




*Elox-converted Cincinnati Tool & Cutter Grinder for Electrical Discharge Machining of single point and form tools.*

*Comparison of an Elox Electrical Discharge Machined single point tool (left) and a conventionally ground tool (right), showing the absence of grind marks and edge cracks in the Eloxed tool.*

checks and feather-edges or smear-over edges, and has no directional marks or heat checks. Once the machine is set the operator has no control over the finish, this finish being accomplished by the machine alone. With a PS-50 power supply hooked to the machine tool, .008 cubic inches per minute can be removed from a carbide tool.

In single point tool grinding, three Elox converted Cincinnati cutter grinders can be operated by one man. Setups are accomplished at the bench, presetting predetermined rake angles, included angles and reliefs. The transfer plate holding the tool is then locked into place in the converted machine tool and the starter actuated. The machine then grinds the radiuses and faces of the tool and shuts off automatically. While this operation is in progress, the second machine is set up and put into operation. Additional transfer plates are then set up for each of the machines so as to permit merely an exchange of transfer plates to minimize machine down time. This technique increases operator efficiency and decreases fatigue. Reports from industry indicate from 5% to 700% better tool life on tools electrically discharge machined.

A major advantage to electrical discharge grinding is the fact that several tools can be ground on one fixture at a time. A division of the major automotive industry grinds six end mills in one pass on an Elox converted Cincinnati vertical mill, utilizing a magnetic chuck as a holding fixture. A roughing pass setting is used to remove .040 to .050 inches from the inserts, requiring 50 minutes per pass. By mechanical means (diamond wheel grinding), only two end mills could be ground at one time, requiring 40 minutes.

Carbide tipped single point tools are ground on the same machine. A block type fixture holds four tools at an angle of 7° to the brass wheel, mounted on a magnetic chuck, for the first pass. The fixture's sides are machined to give automatically the chamfer and included angle settings on succeeding passes. From .020 to .030 inches is removed from all tool faces, depending upon the condition of the tool. The time required for grinding four tools completely is 15 minutes. This compares to a 30 minute time requirement for mechanical grinding. Tool life is reported to be three times greater after Elox grinding than with diamond wheel methods due to eliminating the heat checking and feathering edge.

For a chaser type grinding a special T-slot type fixture mounted in a vertical clamp type chuck is required, one mill being done for each setup. Electrical discharge grinding requires removal of .025 inches to .030 inches depth of cut from the ¼" x ½" face of the cutter. Time required for the grinding of each hollow mill—five minutes. This time compares with the 15 minutes of the mechanical process. It is to be remembered that brass wheels only are used in this process. It requires $3.00 worth of brass grinding tool to remove one cubic inch of tungsten carbide as compared with a reported cost of $30.00 of diamond wheel to accomplish the same amount of carbide removal. • • •

# Effect of Work and Wheel Speeds on Surface Conditions

By **J. A. Plusch***

Recent work on grinding conditions and their relationship to residual stresses has shown that higher Work Speed and lower Wheel Speed decrease surface stresses. Since excessive tensile stress is generally considered important in surface injury, these two variables may be employed to eliminate warpage and cracks in ground parts.

Residual stresses in ground parts are important because of their relationship to cracks, warpage and possible lower fatigue life in the parts. Altho not as widespread a cause as once assumed, high tensile stresses induced in the surface of a part by grinding can lead to the foregoing defects. These defects are related to the magnitude and depth of the tensile stress. Reduction of tensile stress will reduce the chance of cracks and warpage.

*Member of the Research Technical Subcommittee of the Grinding Wheel Institute and Abrasive Grain Association. This article is based upon research sponsored by these organizations at the Mellon Institute of Industrial Research.

Obviously it is desirable not only to avoid grinding conditions which are actually abusive, but to employ techniques which will promote the best possible quality in the finished part.

### Study by the Grinding Wheel Institute

In recent work sponsored by the Grinding Wheel Institute at the Mellon Institute on grinding conditions and their relationship to residual stresses, two grinding variables were noted which may be employed toward achieving this goal. These are Work Speed and Wheel Speed.

### Work Speed

In the surface grinding of annealed tool steel, work speeds varying from 10 to 60 feet per minute were investigated. The higher work speeds tended to result in lower surface stresses. Since this stress is generally considered important in surface injury some advantage is indicated for the higher work speed.

The thickness of the stressed layer was affected very little by the difference in work speed. Since increasing

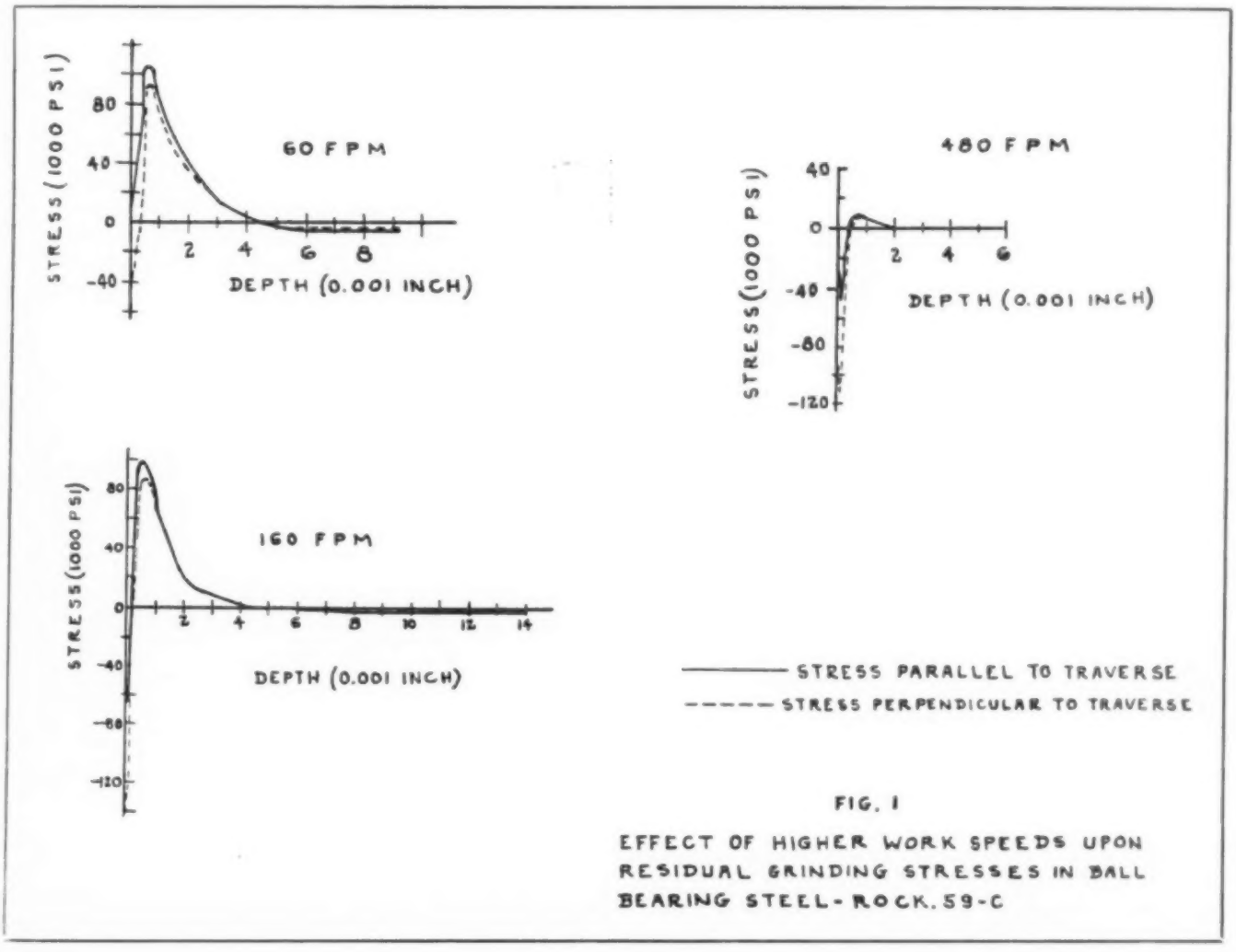


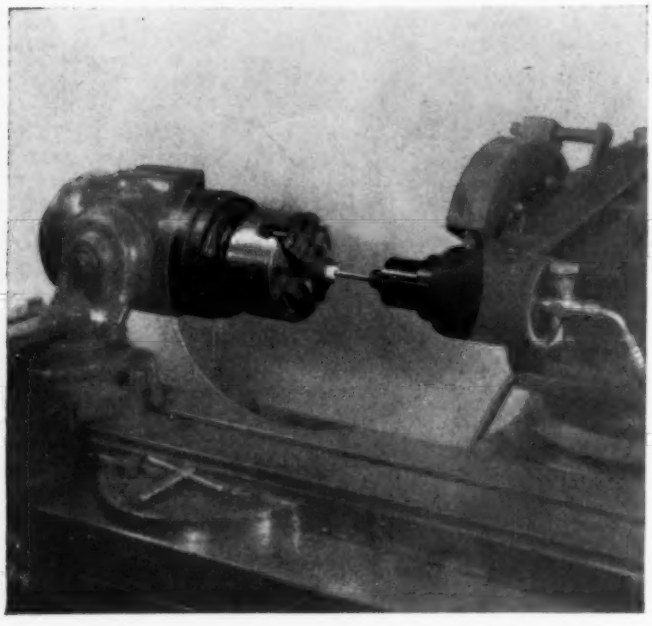

FIG. 1

EFFECT OF HIGHER WORK SPEEDS UPON RESIDUAL GRINDING STRESSES IN BALL BEARING STEEL - ROCK. 59-C

H○LES

JIG GROUND with

*Vulcanaire*



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## Work and Wheel Speeds

*(continued)*

the work speed does not increase the depth of stress penetration, advantage can be taken of the reduction in surface stress without increasing the thickness of the stressed layer.

Previous work has shown that for light cuts both the magnitude of the surface stress and the thickness of the stressed layer decrease with decreasing depth of cut. Therefore, a light cut in combination with high work speed will normally result in a thin stressed layer and relatively low tensile stress.

In December 1954, Dr. R. S. Hahn of Heald Machine Co. and Dr. L. P. Tarasov of Norton Co. collaborated in surface grinding of Ball Bearing Steel test specimens (RC59) at work speeds of 160 and 480 feet per minute using a Heald rotary table surface grinder. The Grinding Wheel Institute Fellowship measured the stresses in the specimens for these speeds as well as in a specimen ground at 60 feet per minute. Increasing the work speed to 480 feet per minute resulted in a marked decrease in the magnitude and depth of penetration of the stress. (See Figure 1)

As a practical example, in June 1955, Dr. Hahn showed evidence that cracking of carbide tools was eliminated by increasing the work speed. (Reference 1.)

### Wheel Speed

The effect of wheel speed was likewise investigated by the Grinding Wheel Institute, for technical purposes. The speed was reduced from 6000 to 3000 surface feet per minute using a work speed of 40 feet per minute.

The most obvious effect of the lower wheel speed was the attendant reduction in depth of stress penetration. Roughly stated, cutting the wheel speed in half also cut the thickness of the stressed layer in half. The same effect, however, can be obtained using a softer grade wheel at normal speed.

The surface generated by the lower wheel speed was appreciably rougher and the wheel wear was about 1/3 greater. Nevertheless, where it can be demonstrated that low wheel speeds generate more favorable stress distributions from the standpoint of service life, there may be applications where some sacrifice in grinding efficiency is warranted.

Examples of these applications are found in the grinding of Titanium (2) and High Temperature Alloys (3).

Higher Work Speed, Lower Wheel Speed and combinations thereof, may be used to reduce the magnitude and penetration depth of grinding stresses resulting in safer, longer lasting parts.

Where it is not convenient to reduce the wheel speed it is generally more practical to use a softer grade wheel. • • •

### References

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2. "Influence of Various Grinding Conditions Upon Residual Stresses in Titanium", by P. A. Chlorite and E. C. Reed, ASME Paper 56-A-44, 1956.
3. "Analysis of Residual Stresses in Ground Surfaces of High-Temperature Alloys", by R. D. Halverstadt, ASME Paper 57-SA-62, 1957.

*Richard L. McKee*, formerly technical editor, Public Relations Branch of The Carborundum Company, Niagara Falls, New York, has been appointed Associate Editor of GRINDING and FINISHING Magazine. He assumed his new position on June 2.

As technical editor, Mr. McKee was responsible for editing and placement of articles prepared by Carborundum technical personnel. In previous assignments with the company, he had been staff assistant, Industrial Relations; technical writer for manufacturing process specifications, staff engineer, job description and evaluation, and assistant training supervisor.

Before joining Carborundum, Mr. McKee spent three years with U.S. Steel as a technical writer.

Mr. McKee is a graduate of Penn State, holding both a bachelor's and a master's degree, majoring in English, from the university.

J.D. SNIDRO METAL FINISHERS
IT'S THE FINISH THAT COUNTS!
IF IT'S METAL- WE FINISH IT!
IF WE FINISH IT - IT'S REALLY FINISHED!
HANK FOSTER

"Look at the books, Henry. We're finished."

Now...

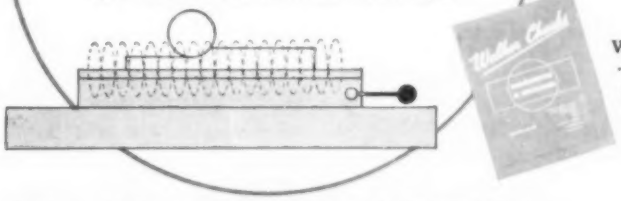
**THE WORLD'S FINEST 10 x 15"**
**PERMANENT MAGNETIC CHUCK***

The new 10" x 15" O. S. Walker chuck, with super-strong ceramic magnets, has licked every problem formerly associated with this size. You get maximum holding power, without expensive wiring and controls, yet you get *complete demagnetization* in the "off" position. The "on-off" lever is extremely easy to actuate. The 10" x 15" weighs only 69 lbs. and is just 2⅝" high, thus minimizing machine table inertia, while leaving maximum machine capacity. The face of the chuck is *all* steel (no soft insulating material) to assure flatness, parallelism and dimensional stability. Fine pole divisions, with ¼" bar poles, hold even thin or narrow work tightly and uniformly over the entire face. Other permanent chucks with ceramic magnets are available in sizes 6" x 10", 6" x 12", 6" x 18" and 8" x 24" — the most complete line anywhere.

*Patents Pending

*Perfect for milling, too!*

Walker permanent chucks have exclusive construction with magnets polarized *horizontally*. Cutter is constantly *demagnetized* as it progresses, with *no fouling* of cutter, work and chips!



Write for new Catalog 58 — it gives complete details on the Walker line of permanent, electro and vacuum chucks.

**O. S. WALKER COMPANY, INC.**
**WORCESTER 6, MASSACHUSETTS, U.S.A.**
*The Original Designers and Builders of Magnetic Chucks*

**. . wherever abrasive operations are performed**

# Questions and Answers

By **Arthur Rakestraw**

• *Why does one lot of wheels sometimes act harder or softer than another lot of the same nominal grading?—J. H.—Cleveland*

It would be somewhat unusual for all of the wheels in a given lot to be off-grade, unless there had been a definite error in making or marking the wheels.

As in other classes of industry, however, the manufacturers of abrasive wheels have definite grade standards, allowing a slight variation above and below the established grade desired. These variations are necessary from the manufacturing cost standpoint. If it were required to ship only the wheels that were exactly on grade, the rejection of those slightly above and below would increase the cost of the on-grade wheels to an objectionable degree.

The established limits of grinding grades, however, are sufficiently close to produce uniform grinding action on the majority of grinding applications, when once the proper specification has been decided upon.

There are, however, many instances to be found in high production plants, where identical parts are produced day after day, where any slight difference in grinding action is readily detected by the experienced operator. These grinding machine operators become so adept and their senses of observation and feel so keen that they can notice the slightest difference in grinding action. While the research departments of the grinding wheel manufacturers are constantly working toward closer control, and have made considerable progress in that direction, it is quite possible that a very experienced operator will always be able to detect slight differences between wheels supposedly of the same grade marking.

While you did not say so, it is assumed that all other conditions are identical. It hardly seems necessary to point out that as a wheel wears it tends to act softer, unless wheel speed is increased to maintain relatively constant speed in terms of surface feet per minute, or that a given wheel used dry will act differently from the same wheel used with a coolant. •

• *What are some of the causes of chatter on work ground with coated abrasive belts? How can these conditions be remedied?—F. P.—Chicago*

On abrasive belt operations, either flat or cylindrical, chatter might result from a number of causes, chief of which is vibration. In the majority of belt applications, the abrasive belt is held against the work being ground by a backup or contact wheel. The resulting abrasive belt contact with the work is therefore a line contact. Any vibration of the contact wheel, or of the driver or idler, is transmitted to the work, resulting in chatter marks.

The solution to the difficulty is to see that all rotating parts—contact wheels, idlers, and pulleys if there are any—be put in suitable balance. All bearings should also be checked and tightened. Sometimes sufficient grinding swarf may collect in the contact wheel or the idler to cause vibration and chatter. It is essential that swarf be cleaned out periodically.

In the case of cylindrically ground work, chatter may result if the work piece were not revolved at a uniform rate. •

• *What are the advantages and disadvantages of roll grinding with abrasive belts?—M. V.—Cincinnati*

Roll grinding with abrasive belts is a relatively new development. It has been claimed that it reduces the time required for grinding metallic and rubber rolls, while maintaining finishes and accuracy equal to those obtained by traditional methods of roll grinding.

At present, it would probably be fair to say that the method has not been in general use long enough to determine what its advantages and disadvantages really are for specific applications. If you have a specific application in mind, and can give us some more information as to the kind of rolls to be ground and the available equipment, we shall be glad to look further into the matter. •

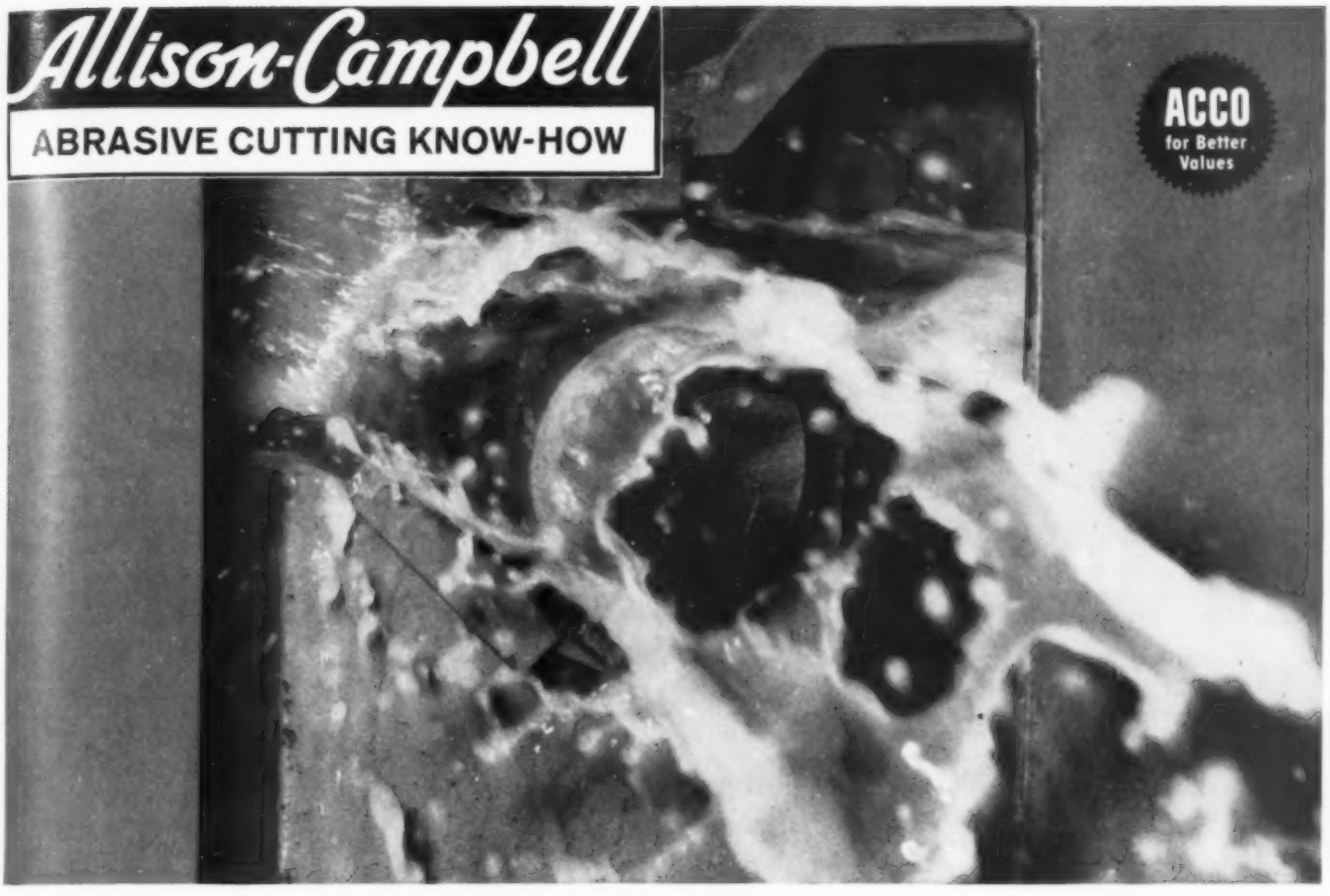
We've been asked . . . and Arthur Rakestraw has answered . . . quite a number of questions since "Q & A" was instituted a few months back.

But what's your problem in the use of abrasives? Whatever it is, chances are that other people have the same difficulty. So if you send your question in, you'll not only get it answered, but you'll be doing other readers a favor as well.

—The Editor

Allison-Campbell

ABRASIVE CUTTING KNOW-HOW



ACCO for Better Values

# Proper Use of Coolant Means Better Abrasive Cutting

• Wet abrasive cutting eliminates burning, minimizes burr, and gives a finer finish than any other cut-off method—and the key to this quality is proper coolant application. Here are the three essentials of adequate cooling:

1. Volume of coolant, rather than pressure, must be kept at a high level for maximum wheel life.

2. Coolant must be accurately directed to the *point of contact* between the wheel and the work, because this is the point at which most heat is generated.

3. Coolant must be applied equally to both sides of the wheel to avoid crooked cuts and wheel breakage.

**Radial holes** in ALLISON wheels carry coolant deep *inside* the cut itself. This extra cooling action assures clean cuts and maximum wheel life on solids from 2″ to 12″ round or square. These holes also impart a self-dressing action to the wheel, keeping sharp grits exposed for cool, fast cutting.

### Allison-Campbell Design Assures Proper Cooling

**High volume of coolant** is provided by a large reservoir and an extra-capacity coolant pump.

**Good distribution of coolant** is assured by a coolant distributor, standard on all CAMPBELL machines. This can be adjusted and locked in position to provide equal distribution of coolant to both sides of the wheel and to the work.

**High-speed, quality cuts** on almost *any* material are possible with modern abrasive cutting techniques. Your ALLISON-CAMPBELL Field Engineer will be glad to recommend the right machine and wheels for *your* cut-off jobs. Call on him for help.

**A complete selection** of machines and wheels for *any* cut-off application is offered by ALLISON-CAMPBELL. Four types of CAMPBELL machines—chop stroke, oscillating, horizontal, and rotary—in capacities from the smallest stock to 14″ rounds . . . billets up to 12″ square . . . plate up to 6″ thick and 20 ft. long. ALLISON wheels—more than 150 different specifications—rubber or resinoid bond—3″ to 34″ diameters—.006″ to 3/16″ thick.

Write for a copy of DH-20, a new bulletin describing the ALLISON-CAMPBELL Demonstration Laboratory, and how you can take advantage of the special services it offers. Complete details on ALLISON wheels and CAMPBELL machines are also available.

**ALLISON-CAMPBELL DIVISION**
**AMERICAN CHAIN & CABLE**

926 Connecticut Avenue, Bridgeport 2, Conn.

ACCO

# Lapping Saves Time and Increases Accuracy at Barber-Colman

*This lapping machine and surface grinder are operated by one man who loads and unloads first one then the other. The addition of the lapping operation has cut time and increased accuracy.*

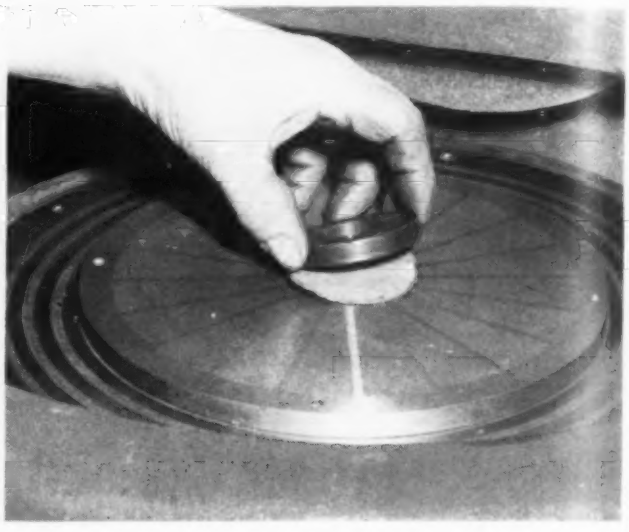
- *Adding lapping operation saves time with no increase in labor.*
- *Accuracy increased from .0002 to .00015.*
- *Use felt to prevent warpage.*

by **Morrey M. Patterson**
**Managing Editor**

• The Barber-Colman Company at Rockford, Illinois, has added a lapping operation to the grinding of parts requiring flatness and parallelism. These parts had been successfully surface ground to within .0002" for flatness and parallel sides, but the operation would take between a half an hour to two hours, depending on hardness and warpage of the part. The difficulty was to obtain the flatness.

This company now produces these parts in a half an hour regardless of the part condition and has cut their tolerances to within .00015" for flatness and parallel.

Production of the parts varies in lot size and frequency as Barber-Colman Company manufactures machine tools, radio controlled doors, controls and other special equipment. Size and shape of the parts will also vary. However, the lapping on the Lapmaster manufactured by Crane Packing Co., Morton Grove, Illinois, is used for only those parts ¼" thick or under. The material will vary from stainless steel (which is lapped only) to hardened steel or cast iron. The normal finish required is 8 to 10 micro-inches. If less than 8 micro-inches is required the parts are simply left on the lapping machine longer. The lapping solutions remain the same regardless of finish or material.



*A piece of felt is placed under the rough part to support the part evenly and prevent warpage during the surface grinding.*

Accuracies are checked on a comparator located on a granite block.

The rough parts as they reach the grinding machine are placed on a magnetic chuck with a piece of felt under them. This innovation supports the part evenly so that the top side may be ground to a fair degree of flatness with less effect by warpage. The part is then removed and placed in the Lapmaster (which does not require fixturing) for lapping of the side just ground. For the lapping operation felt is used to cover the part when using weights. These weights are used to speed up the lapping operation when the part's own weight is not enough. Here again the felt is next to the unfinished side of the part.

After lapping of the first side the part is again placed on the surface grinder, this time without felt and with the unfinished surface up. At this point the first side has reached the flatness required and is used to locate for parallelism of the two sides. After grinding of the rough side the part is placed back on the lapping machine to obtain the flatness and finish of the second side.

The operator now works both machines by loading one while the other is in operation. The time is balanced between the two operations. • • •

# SHOP HINTS AND KINKS

## Long Bar Attachment for Centerless Grinder

By **Mike Radakovich**

• Frequently a job machine shop is faced with the problem of grinding, on a centerless grinder, stock too long to be handled on regular thru-feed fixtures. Commercially-available fixtures are expensive and can rarely be justified for any shop which does not consistently grind long stock.

The illustrated fixture was developed and assembled from parts that can be found in any shop. Besides being inexpensive to build, it can be quickly and easily attached to the grinder and adjusted, cutting set-up time to a minimum. It has handled stock as large as 3½" in diameter and 20' long, holding tolerances of .002" with a finish of 10 micro-inches.

The fixture consists of a main channel iron which can be attached to the centerless grinder with two bolts. Two adjustable legs on casters, on the end away from the grinder, and a number of adjustable roller assemblies which can be fastened to the channel with "C" clamps complete the set-up.

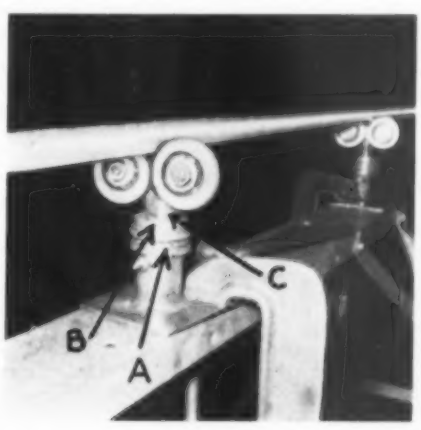
*Long bar attachment attached to centerless grinder. Adjustable "Y"-stand in foreground supports overhang of the bar.*

The roller assemblies are made primarily of discarded ball bearings bushed up with aluminum sleeves, as illustrated. Each assembly has a threaded stud "C" with an adjusting nut "B" above a thrust ball bearing "A", allowing fine adjustments up and down. Forward and back adjustments are made by positioning the roller assemblies with the "C" clamps.

*Close-up of roller assembly clamped to main channel iron, looking away from the centerless grinder.*

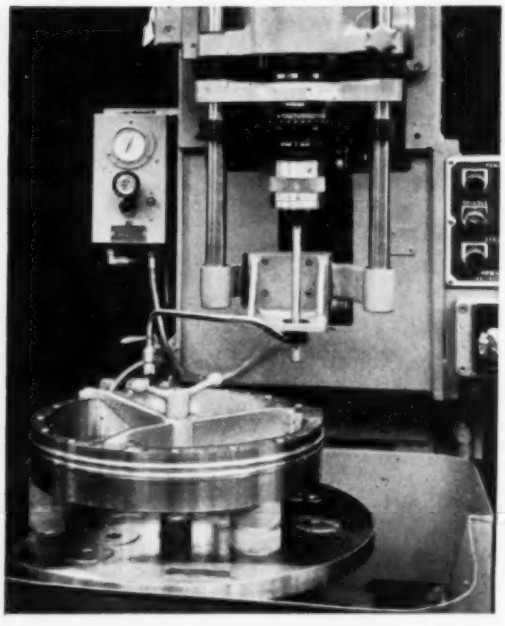
Once the desired feed rate is established for the job the upper rollers are locked in place by a set screw, and the rollers feed the stock through when contact is made with the regulating wheel.

The complete unit has enough flexibility to permit grinding stock that is not perfectly straight, and is still rigid enough to keep straight stock straight. •



# WHY Pratt & Whitney MICROHONES Bores In Titanium Spacers

Rotor disc spacers, that are used in jet engines, require accurate bores having consistent surface finish. Thus, the final processing method must generate bores with diametric and geometric accuracies within .0005" and consistent finishes of 15 microinches.



But, Pratt & Whitney Aircraft Division, U.A.C., faced additional problems in selecting the final processing method for these .110" length bores in titanium spacers. Because the spacers are manufactured in 20 different heights and bores in two diameters, efficient production demanded extreme versatility of the processing method used.

Here's why Pratt & Whitney chose the Microhoning process and equipment to economically produce the required results: Microhoning, in removing .004" of stock from each bore, accurately holds to size and finish requirements; and because the fixturing positions all 20 spacer heights at same work level, the tool stroke never needs adjustment. The Microhoning of all 16 bores in each titanium spacer is completed in about 7 minutes (including loading and unloading time).

Learn why Microhoning will give efficient stock removal, closer tolerances, accurate alignment and functional surfaces.

☐ Please have a Micromatic Field Engineer call.
☐ Please send Micromatic literature and case histories.

NAME _____

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COMPANY _____

STREET _____

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MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN




## Carbide Liner for Periphery Guide on Surface Grinder

By **J. Giamalis**

• The periphery guide for the Gardner double disc type surface grinder is subject to wear from pressure and friction resulting from holding work pieces in position between grinding wheels. When wear becomes excessive, the guide required re-working and chrome-plating, which is expensive.

The installation of a carbide lining on the wear surface of the guide has yielded twenty times the life of the chrome-plated surface, to say nothing of the saving in time and money over the previous method. My company figured that this change saved $7,500 per year. •

## Grinding Bowed or Twisted Steel

By **Augustine P. Moran**

• A thin piece of rubber, placed on the magnetic chuck under a bowed or twisted piece of thin sheet steel to be ground, will help to secure a flat surface for grinding. For best results, the rubber sheet should be approximately .020" to .030" thick.

During the grinding operation, the ends of the sheet are sufficiently imbedded in the rubber to compensate for the bowing or twisting. •

## Tool Post Grinder Diamond Mount

By Clifford T. Bower

One reason why users of tool post grinders mounted on lathes get very poor results is due to the lack of proper provision for mounting the dressing diamond in a convenient position. Some users of tool post grinders have been known to traverse the diamond across the wheel edge by holding it in the hand.

A good place to mount the dressing diamond is on the lathe tailstock barrel. The actual mount comprises a sturdy rod drilled at an angle to take the mount of the diamond dresser; the wheel is traversed leftward during the dressing cut to obtain the desired dragging effect which eliminates diamond chatter. The rod is clamped into a shaped piece of steel which can be clamped to the diameter of the tailstock barrel by means of the screw spanning a saw-cut.

The tailstock body should be clamped to the lathe bed and the barrel clamp should also be tightened during wheel dressing. Cut is applied to the grinding wheel periphery by feeding in the lathe cross slide.

*"Back scratching again! No wonder you insisted on papering with abrasive paper."*


# HOW Pratt & Whitney MICROHONES Bores In Titanium Spacers

By Microhoning the bores in rotor disc spacers used in jet engines, Pratt & Whitney obtains final stock removal that efficiently produces close diametric and geometric accuracies (within .0005″) and consistent surface finishes of 15 microinches.

Here's how a Hydrohoner produces these accurate results in 20 different sizes of titanium spacers . . . each spacer having 16 bores that are either .680″ or .590″ in diameter and .110″ in length.

The Hydrohoner is equipped with precise feed and sizing controls that automatically expand and collapse the tool, compensate for abrasive wear, and terminate the Microhoning cycle when required bore size is reached. Also, because fixturing is designed to position all spacers at the same work level, the tool stroke never needs adjustment.

A rotary indexing table automatically locates each bore under the spindle and stops the Hydrohoner when all 16 bores in each spacer are finished. A lateral indexing feature positions the fixture to accommodate various spacer sizes. In fixture change-over, no special tools are required for simple exchanging of four details, and the switch from one spacer size to another requires but a few minutes.

☐ Please send me your movie "Progress in Precision" in time for showing on _____ (date).
☐ Please have a Micromatic Field Engineer call.
☐ Please send Microhoning literature and case histories.

NAME _____
TITLE _____
COMPANY _____
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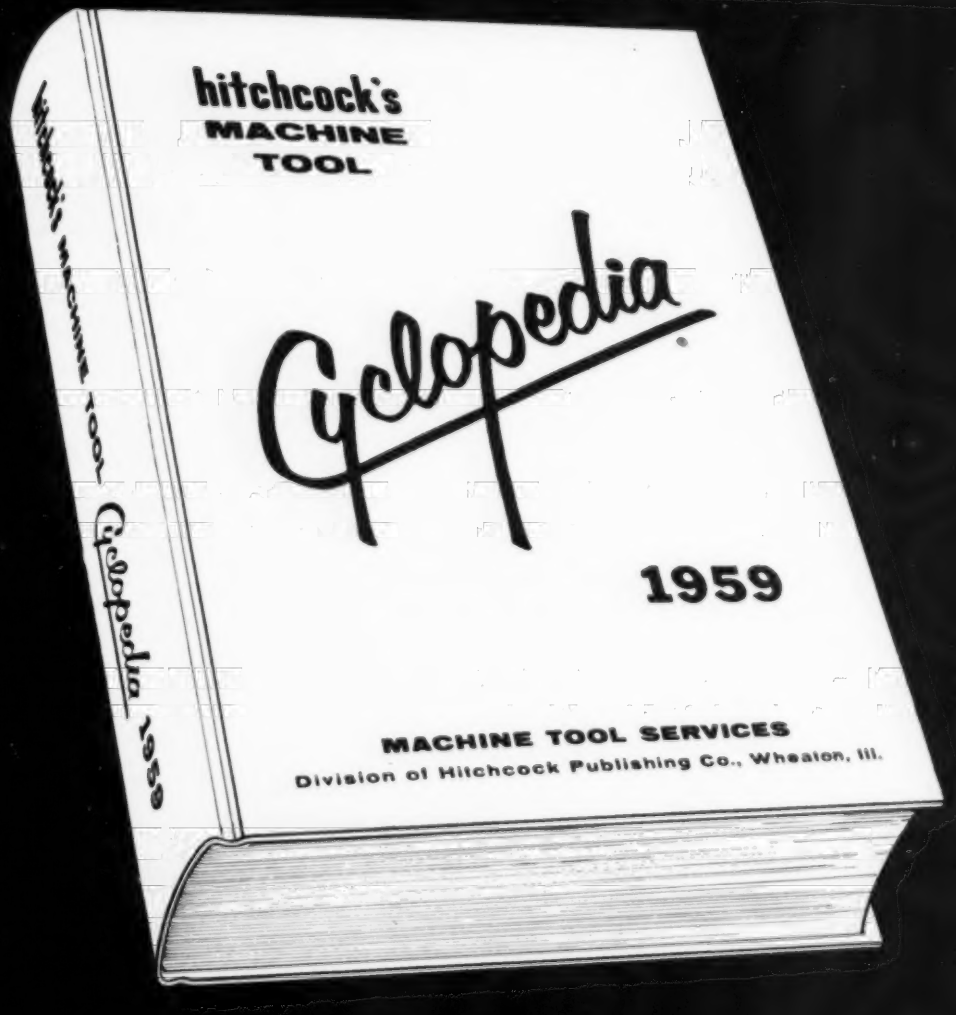
**MICROMATIC HONE CORP.**
8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

# Machine Tool Buyers SAVE TIME by referring to



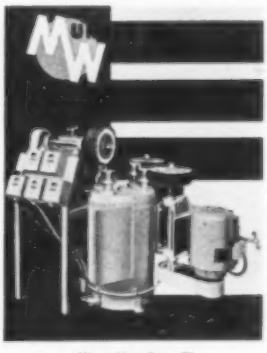
**...wherever abrasive operations are performed**

# Free Literature

Use the postpaid card opposite page 64 to receive your copy of any of the literature listed on these pages. Just circle the proper number on the card which coincides with the number which precedes the paragraph. We'll do the rest.

(See Number 3)

(See Number 4)




(See Number 5)

**1. Gages for Missile Production.** "Precision Measuring for Missile Production" is the title of a brochure describing various types of gages for measuring critical dimensions and dimensional relationships in a variety of critical parts for guided missiles. Each gage is illustrated with dimensions clearly described and diagrammed. The dimensions include parallelism, squareness, co-planerity, and concentricity, to mention a few. Federal Products Corp., 1144 Eddy St., Providence 1, R.I.

**2. Lubricants.** Bulletin 116 contains a valuable chart for machine shop personnel to show where and how Molykote lubricants should be applied. The chart indicates the equipment on which to use the lubricant and method of applying it. The Alpha-Molykote Corp., 65 Harvard Ave., Stamford, Conn.

**3. Surface Roughness Measurement** can be specified in microinches and measured with the handy portable Profilometer. This direct-reading shop instrument is discussed in four-page bulletin available. Micrometrical Mfg. Co., 345 So. Main St., Ann Arbor, Mich.

**4. Expanding Mandrels.** Featured in brochure are mandrels of the type A extra wide bore range with step jaws, type B wide bore range with long straight bearings (for bores from $\frac{3}{8}$" to $7\frac{1}{4}$"), and type M narrow range straight bearings (for bores between $\frac{1}{4}$"x$\frac{1}{2}$"). The three-jaw grip is said to correct inaccuracies in bore of work. The parallel holding surfaces permit heavy cuts in tough steel. Tabled specs. are given. LeCount Tool Works, Inc., 38 Cody St., W. Hartford 10, Conn.

**5. Polishing and Buffing Machine.** The Junior Automatic, as described in leaflet, reduces several manual or semi-automatic operations to one simple fixturing. There are also the advantages of adjustable cycle and dwell timing, and the saving of floor space. The machine consists of a basic standardized dial table and a full line of supplementary equipment. Murray Way Corp., P.O. Box 180, Birmingham, Mich.

**6. Size Control Hones.** The Jes-Cal rigid drive shaft hones are said to minimize mechanical chatter, eliminate whipping action and produce more consistent abrading action, according to colorful brochure available. It was also stated that consistent surface finish in whatever roughness desired is produced. Size control tapered gage and open-side mounted honing stones are also described. Jes-Cal Co., 31485 Groesbeck Highway, Fraser, Mich.

**7. Grinding Wheels.** Resinoid grinding wheels, standard cup wheels, segmental disc wheels are described in brochure. Resinoid bond A-CA-FA-WA abrasive prefixes, type 1 straight wheels, are described and priced also. Acme Abrasive Co., 24200 Marmon, Centerline, Mich.

**8. Materials for Precision Barrel Finishing,** as alkaline type compounds and acidic type compounds, are discussed in brochure. The correct materials for cutting down, descaling and burnishing are suggested, with some rules for better barrel finishing. There are a few words about water levels and media-to-work ratios. Oakite Products, Inc., 19 Rector St., New York 6, N.Y.

**9. Safety Glasses.** Colorful booklet describes the onyx on crystal spectacle-type safety glasses which utilize frames with new safety features. Patented eyewire has a specially developed groove which not only holds lens securely, but is designed to support lens against being driven backward toward eye when struck. The 2-Tone won't conduct electricity, is flame-resistant, strong and lightweight. American Optical Co., Southbridge, Mass.

**10. Filter.** The Impinjo filter offers a high degree of cleaning for coolants and cutting oils when more than separation or clarification is required, according to bulletin 9020 available. Automatic in operation the filter is easy to install in existing tanks or on the floor. It is said to deliver a drier swarf for disposal, and requires no backwashing. Infilco, Inc., Tucson, Ariz.

**11. "Diamond Grit Sandpaper Sense"** is the title of the Summer 1958 issue from the firm. It deals with the history of coated abrasives, with illustrations to clarify the reading. The expansion of the manufacturer's facilities is described, for the purpose of research into new and better finishing methods, research in improved coated products, with other advantages. Canada Sand Papers Ltd., Plattsville, Ont., Can.

**12. Tumbling Barrels.** The Tumb-L-Matic multiple pocket units, wet or dry process barrels are described in bulletin. They are designed for small scale production deburring, cutting down, precision surface finishing, etc., in metals and plastics. The submerged type is for wet processing only; the self-contained, for wet and dry processing. Tumb-L-Matic, Inc., St. Marys St., Stamford, Conn.

# NEW TORIT DIAMOND DUST COLLECTOR SAVES YOU UP TO 30% OF CARAT USAGE; COSTS ONLY $178.50!

Dust from these diamond wheels . . .

was recovered by this Torit Diamond Dust Collector . . .

at the rate of (50.5) carats in 14 days.

*exclusive new centrifugal design simplifies recovery, serves all diamond grinding operations*

**Actually pays for itself in days.** In an on-the-job test of this new TORIT equipment, the initial investment was returned in just 21 operating days. The test was conducted by a leading automobile manufacturer under regular operating conditions. Recovery averaged 30% of the carats originally contained in the diamond grinding wheels. You actually get a cash return of $1.00 for every $10.00 invested in diamond grinding wheels.

**For all diamond grinding operations.** This new TORIT Collector provides the same outstanding performance in all types of grinding operations—mist, wick or dry. Its design and operational simplicity also mean virtually maintenance-free service. Its tough construction assures long, long life.

**Installs anywhere.** TORIT'S new Diamond Dust Collector can be used alone or in conjunction with central exhaust systems or unit dust collectors. It weighs only 65 lbs. and requires only 14" x 22" floor space. Its centrifugal separating action uses no filters or sloppy, inflammable oil baths. Service is quickly and conveniently performed by simply unscrewing the unit's top for removal and emptying of the clear plastic container.

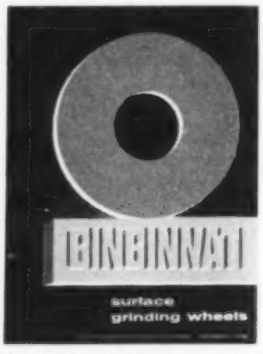
**FREE details and full specifications on request.** Here's your chance to really save on your diamond usage. Write today for full information on this important new diamond grinding development.

**TORIT MANUFACTURING COMPANY** Walnut & Exchange Sts., Dept. 510, St. Paul, Minnesota


## FREE LITERATURE *continued*

(See Number 6)

**13. Surface Grinding Wheels** are described in booklet PG-349. The Cincinnati straight sided wheels, segments, cylinders, cups,

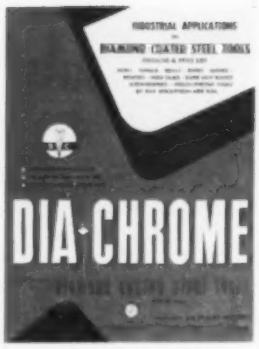



and nut inserted wheels for surface grinding operations are discussed. A helpful table of suggested gradings for surface grinding is also included. Cincinnati Milling Products Div., Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

**14. Blower-Compressor.** A four-page brochure describes the Hoffman CycloBlower, an axial flow, positive displacement

blower-compressor for outstanding pressure, vacuum or combination service. Featured are clean air-gas delivery, efficient, and shock-free compression. U.S. Hoffman Machinery Corp., 105 Fourth Ave., New York 3, N.Y.

**15. Diamond Coated Steel Tools.** Dia-Chrome saws give high-speed operation without coolants with a smooth, clear finished edge, according to brochure. Circular saws are available in sizes from 2" up to 18" in diameter with two types of blades. Mounted saws are available in any specified size with the 1½" and 2" diameter saws in greatest demand. Various articles on diamond tools are included also. Dia-Chrome Co., 722 So. Verdugo Rd., Glendale 5, Calif.




(See Number 15)

**16. Hydraulic Surface Grinder.** Catalog of the Swedish made Malcus hydraulic surface grinder describes units of three sizes, 9"x24", 10"x29" and 12"x39". Adjustable precision roller bearings and spherical ball bearings are specially combined for controlling the thrust of the spindle. Table movements are rapid and smooth. A large variety of accessories are available. Homestrand, Inc., Larchmont, N.Y.

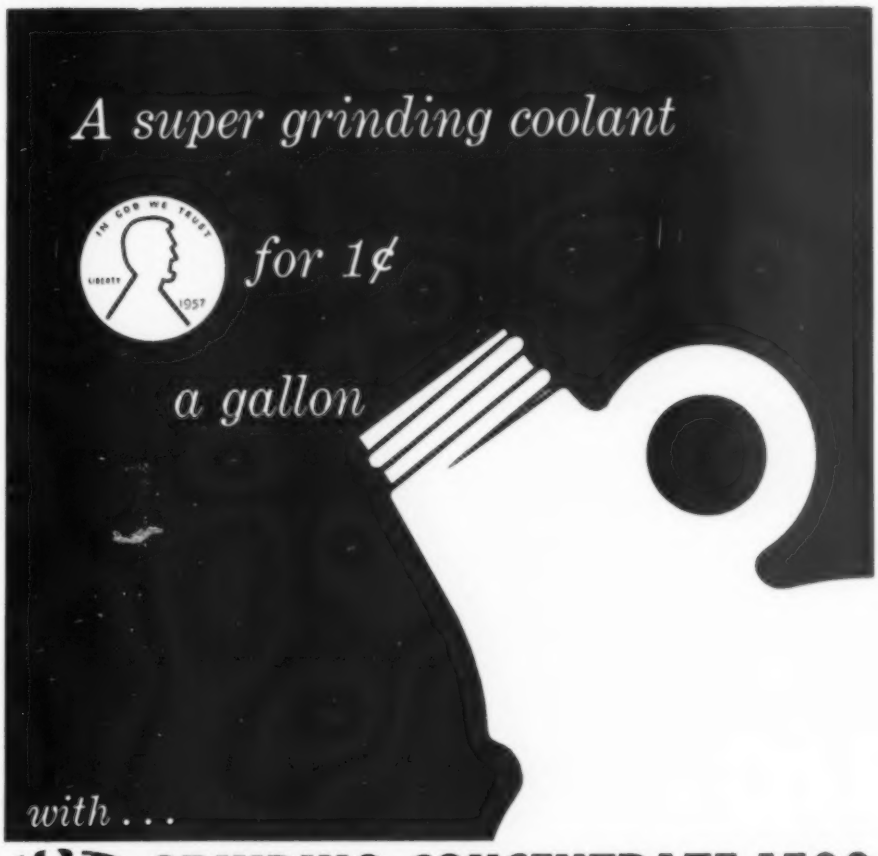
**17. Diamond Lapping Oil.** Optical bulletin No. 4 describes this diamond lapping oil for oil or water coolants. It is said to greatly prolong diamond wheel life, prevent dangerous explosions in the coolant chamber, and prevent diamond wheel from loading and glazing. Stadoil Mfg. Co., 3300 N. Durfee Ave., El Monte 5, Calif.

**18. Metal Finishing Equipment.** Described in flyer are products as a paint spray booth, in which water wash cleans air stream to ½ grain per thousand cubic feet. A gear washer automatically degreases one ton of gears an hour. The blow off dryer removes moisture using high velocity hot air. Fourteen other items are also listed. Ramco Equipment Corp., 1373 Lafayette Ave., New York 59, N.Y.

**19. Heavy-Duty Roll Grinders.** A 28-page bulletin is now available on the roll grinders. There are photographic illustrations and cross-section drawings of important features of the machine, including a number of recent design innovations. Tables of general specs. and dimensions and weights for all six sizes are also included. Farrel-Birmingham Co., Inc., Ansonia, Conn.

**20. Steel Equipment.** Obtainable is a reference manual of steel equipment, No. 485. This 48-page catalog analyzes all types of steel shelving, drawers, lockers, work benches and tables, and other storage, store, office, warehouse, and shop equipment. Equipto, Aurora, Ill.

**21. Barrel Finishing Media** are discussed in recent folder. This includes aluminum oxide chips, triangles and spheres, natural chips, novaculite, granite, limestone,




# W+B GRINDING CONCENTRATE 1500

Normal dilution for this entirely different type of coolant is from 150 to 200 parts of water to 1 part W & B Grinding Concentrate 1500. And since W & B 1500 is used in extreme dilutions, one 55-gallon drum provides up to 11,000 gallons of grinding coolant — at a cost of about 1¢ a gallon.

Foamless as water, W & B 1500 gives excellent rust protection and provides a transparent mix that really keeps wheels open. Grinding is keener . . . machines stay cleaner. Chips settle almost instantly. Get complete information on this outstanding grinding concentrate. Fill out and return attached coupon.

***W & B Grinding Concentrate 1500 is being used by many of the country's largest manufacturers.***

W+B INDUSTRIAL LUBRICANTS

**THE WHITE & BAGLEY CO.**

Worcester, Massachusetts • Detroit, Michigan

*Originators of Grinding Lubricants*

*Sulphurized Fatty Bases*

*Grinding Coolants and Lubricants*

*Cutting, Grinding and Honing Oils*

*Forging Compounds*

**THE WHITE & BAGLEY CO.,** 88 Foster St., Worcester, Mass.

Please send me complete information on W&B Grinding Concentrate 1500.

NAME ..... TITLE .....

COMPANY ..... STREET .....

CITY ..... ZONE ..... STATE .....

☐ My plant has a tricky grinding problem on which we'd like advice. I've attached a letter describing it in detail. I understand that you offer this service without obligation.

## FREE LITERATURE *continued*

(See Number 22)

and steel media. Detailed size specifications for each type are given. The Esbec Barrel Finishing Corp., 18 Beech St., Byram, Conn.

**22. Automatic Grinder Controls.** RCA automatic grinder controls for ID, OD, and surface grinding are illustrated and described in a four-page folder issued. Basic advantages of the equipment in providing increased production efficiency and consistent control of quality are covered in the folder, along with operating information. Accessory equipment is shown. Radio Corporation of America, Building 15-1, Camden, N.J.

**23. Barrel Finishing Machinery.** Revised edition of the catalog-data book includes new machines as the Baird Poliaction barrel finishing machines equipped with either Electratilt pushbutton tilting controls or Hydratilt, manual-hydraulic controls. Also listed and detailed are oblique tilting and horizontal machines, ranging from bench models to the largest standard sizes, and including ball burnishing machines. The Baird Machine Co., Stratford, Conn.

**24. Plug Gage Sets.** Specifications for more than 800 Go-NoGo gages are summarized in a single sheet of a new catalog

insert. Presented is the complete line of plug gage sets which feature made-to-order precision at production-line prices. K&K Grinding Co., 230 Richardson St., Brooklyn 22, N.Y.

**25. Adjustable Depth and Groove Location Gage** is discussed in flyer. The gage is designed to locate a groove, and also measure the width of the groove on one setting. The width of the groove can be read directly off the indicator. The measuring rods, in lengths of 3", 4" and 6", are made of hardened drill rod and perfectly finished. Mueller Laboratory, 1052 N. Allen Ave., Pasadena, Calif.

**26. "Grits and Grinds"** is the title of technical magazine devoted to the interests of better grinding, lapping, and surface finishing, published monthly and sent free of charge to anyone who is using, supervising or purchasing abrasives, grinding wheels or grinding and lapping machines. Norton Co., Worcester 6, Mass.

**27. Circular Slide Rule** for engineers and plant executives is available free of charge. Operation is simple and the results are accurate. Instructions are included. General Industrial Co., 5738 Elston Ave., Chicago 30, Ill.

**28. Tumbling Barrel** for deflashing parts molded of soft rubber is discussed in flyer available. It utilizes liquid $CO_2$ which is said to eliminate the storage and handling loss, and labor problems involved in the use of dry ice. Featured also is controlled constant low temperature. The units have an operating

accent on Accuracy!
Whitnon
HIGH FREQUENCY ELECTRIC
Spindles
Modernize your present internal grinders and special milling machines with Whitnon High Frequency Electric Spindles

It's the accent on accuracy that gives this missile perfect performance at high speeds

It's the *accent* on *accuracy*, too, that builds perfect high-speed performance into Whitnon High Frequency Spindles. Whitnon Spindles deliver maximum — and vibrationless — horsepower to all grinding wheels and tools . . . at speeds from 10,000 to 120,000 RPM.

Spring pre-loaded and dynamically balanced after assembly, they assure you better control of finish and size — faster stock removal — and the high quality production that earns you higher profits.

*IN STOCK TO FIT MOST GRINDERS*
*8 HP at 10,000 RPM to ¾ HP at 120,000 RPM*

*Available for:*
- HEALDS
  - 3" Center Height
  - 3½" Center Height
  - 4" Center Height
- BRYANTS
- Special spindles for duplicating, wood and non-ferrous routing, synthetic textiles and spin testing.

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THE Whitnon MANUFACTURING COMPANY
ROUTE 6 AND NEW BRITAIN AVE., FARMINGTON, CONNECTICUT


Do you have any kinks which would be helpful to the next fellow? Send them to GRINDING and FINISHING for publication. All material is paid for! Material can be in your own words, drawings can be rough pencil sketches; our editorial and art departments will do the rest. Send your Hints and Kinks to: Editor, GRINDING and FINISHING, 222 E. Willow Ave., Wheaoon, Ill.

temperature range of 0° to -120° F. Tumb-L-Matic, Inc., St. Marys St., Stamford, Conn.

(See Number 27)

**29. Centerless Grinding Machine.** Greater operator convenience, quicker set-up, closer limits of grinding accuracy than ever before have been built into the

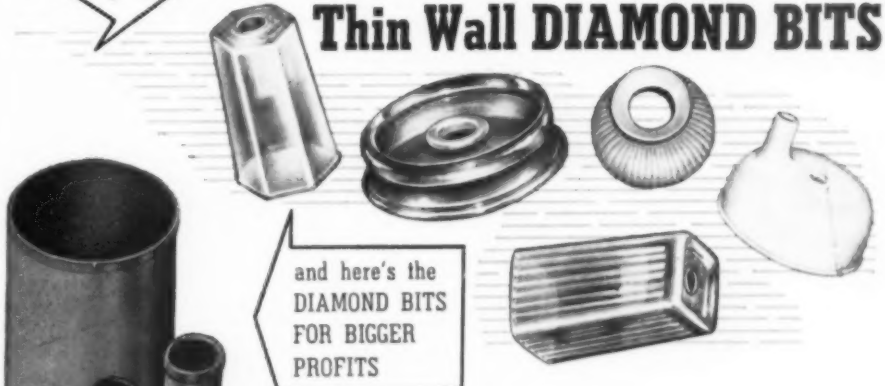
Cincinnati Filmatic No. 2 grinder, according to brochure. Among the many highlights of the machine are the grinding wheel spindle bearings for exceptionally fine finishes, and the bed rock grinding wheel spindle mounting for maximum spindle rigidity for rapid metal removal with accuracy. General specifications and dimensional drawings are included also. Cincinnati Grinders, Inc., Cincinnati 9, Ohio.

**30. American Society for Abrasives.** Goals of the ASA are to unite those active in the field of abrasives, to promote understanding and association between makers and users of abrasives, and to encourage and foster the study, uses, application, and improvement of abrasives. Other objectives are listed in folder obtainable. Each member is urged to join his local Chapter, or to contact headquarters about organizing one if there is no Chapter in his vicinity. An annual conference reflects the most important developments in the abrasives' field. Abrasive material of interest to members is available for reference at the Reading and New York headquarters. The folder also lists information concerning qualifications for membership, location of chapters, and dues. American Society for Abrasives, 222 Berks County Trust Bldg., Reading, Pa.

Do you have any kinks which would be helpful to the next fellow? Send them to GRINDING and FINISHING for publication. All material is paid for! Material can be in your own words, drawings can be rough pencil sketches; our editorial and art departments will do the rest. Send your Hints and Kinks to: Editor, GRINDING and FINISHING, 222 E. Willow Ave., Wheaton, Ill.

Hoffman Bits drill ⅝" spout hole and 11/16" (64 taper) center hole with just one simplified set-up.

**with HOFFMAN Thin Wall DIAMOND BITS**



**. . . thin wall diamond surface set or impregnated bits for drilling and finishing the hardest materials**

Hoffman Thin Wall Bits assure the highest production per bit available anywhere . . . because every bit is designed for the specific job. They produce the efficient, close tolerance results that cut job-time . . . eliminate many reject losses. Put Hoffman Bits to work and see why so many producers are setting new profit records in drilling and finishing glass, ceramics, porcelain, quartz, concrete and many others.

Scientific tests for hardness, cutting ability, etc. of customer's products are made in Hoffman's Laboratories at NO CHARGE. Send a sample of your own product material for testing at no obligation . . . or write for FREE literature.

***Drilling Experts Since 1902***

**HOFFMAN BROS. DRILLING COMPANY**

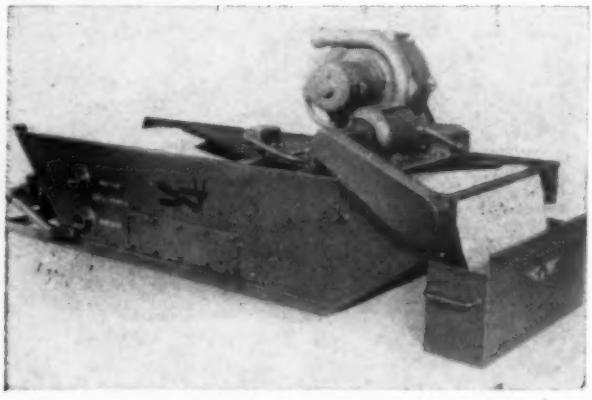
**102 Cedar Street** **Punxsutawney, Penna.**

...wherever abrasive operations are performed

# New Equipment and Materials

For further information on any of the products listed here, use the handy postpaid card opposite page 64.

## Filter Has A Metallic Endless Belt



A new and improved Vacumatic 40 A employs a metallic endless belt, superceding previous models which employ specially woven cloth belts.

The filter, designed for continuous filtration of high flow coolants by vacuum instead of gravity, is considered a marked advance over older models. The new steel belt is designed to operate practically indefinitely.

U. S. Hoffman Machinery Corp., 105 Fourth Ave., N.Y. 3, N.Y.

Use postpaid card. Circle No. 101

## Semi-Automatic Lapping Machine Delivers True Contact Surfaces

A 24" semi-automatic lapping machine is reported to deliver flatness to less than one light band (.00011") and a surface finish as low as 1 microinch rms. It features a fully automatic work cycle, including application of the lapping compound, a variable speed drive for selecting best lapping rate, and specially designed magnetic truing rings which maintain continuous plate flatness while the machine is in operation.

The lapper is designed for lapping small parts in production lots, but can accommodate any large casting or similar part that will fit in any one of the truing rings, which have a 8⅞" inside dia.

There is practically no limit to the type of material that can be successfully lapped. This includes the toughest alloys, which can be lapped in the hardened state, and non-ferrous metals such as brass, bronze and aluminum. In each instance, selection of the proper lapping compound and plate speed is all that is required to produce the required surface finish.

Because operation is simplified, a complete battery of the machines may be easily handled by one operator. The lapping table speed is infinitely variable between 16 and 76 rpm. The lapping compound is automatically supplied from a special tank which has a built-in agitator.

The machine is of rugged, heavy-duty construction, the lapping plate is constructed in massive proportions, and there is a heavy-duty driving mechanism.

Taft-Peirce Manufacturing Co., Woonsocket, R.I.

Use postpaid card. Circle No. 102

The pump casting, pictured, is having its flange lapped to produce a leak-proof joint, allowing gaskets and joint cement to be eliminated.

## Centerless Grinding Fixture

The fixture is a conversion unit which will convert any between centers grinding machine to a centerless grinder. It is adaptable to through feed, in-feed, plunge or form grinding.

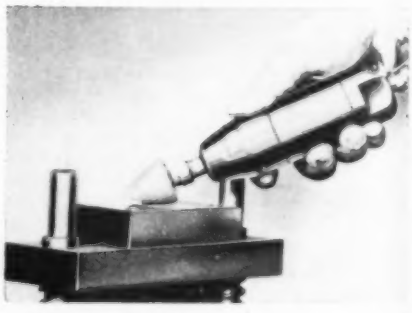
The unit provides the functions of a large centerless grinder, in that the grinding wheel and an opposed regulating wheel form a throat through which the work pieces pass while being supported on a work rest blade. The machine the fixture is applied to provides the grinding wheel and its motivation.

Features are that the work does not have to be center drilled, nor do the centers have to be lapped after heat-treat. The announcement also stated that since the work does not have to be mounted on centers, time required for loading and unloading is eliminated.

S & E Machine Products Inc., Bridgeport, Mich.

Use postpaid card. Circle No. 103

## Heavy Duty Small Wheel Grinder



The Model 400-G grinder is one of the manufacturer's newest air-powered production tools. It is equipped with a positive lever throttle control for quick, safe starts and stops, and can also be provided with a button throttle, if preferred. The tool is designed for general small wheel grinding on large dies, castings, patterns or other intricate construction.

The tool weighs only 1½ lb., and the Airetool ball bearing motor operates at 19,000 rpm. The grinder has a ¼" collet chuck, or can be ordered with a ⅜"-24 thread spindle which will accommodate either a 1½" vitrified wheel or a 2" bonded wheel.

The Airetool Mfg. Co., Springfield, O.

Use postpaid card. Circle No. 104

## Precisely Oriented Stones Multiply Diamond Tool Life

Precisely oriented stones are of importance on heavy industry's use of diamond tools. According to Joe Klipper, Vice-President of Clipper Diamond Tool Co., "From a given diamond which may provide say 100 dressings, it now becomes possible to get from 200 to 1000 dressings simply by proper orientation of the stone."

Methods of X-ray analysis and geometrically exact sawing and cleaving can now yield a steady supply of "custom-cut" stones oriented for maximum hardness against the work.

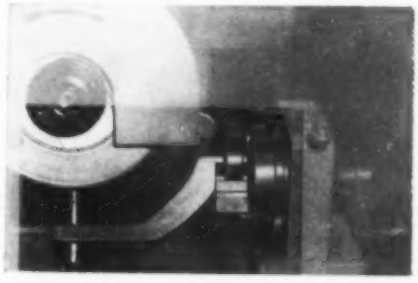
"Several hundred on-the-job tests comparing natural shapes, maccles and sawn slabs on J & L and Hoglund machines, have disclosed that properly oriented stones consistently out-perform the non-oriented ones and with much less variation from one tool to the next. . . . Custom-cut stones are now available in forming, boring and turning tools."

Further details may be had by addressing Clipper Diamond Tool Co., Inc., 345 Hudson St., N.Y. 14, N.Y.

Use postpaid card. Circle No. 105

## Radius Dresser Arm for Grind-All Fixture

The manufacturer has announced a new radius dressing arm attachment for its Grind-All fixture. The easily



set up attachment quickly converts the Harig fixture into an accurate radius dresser. The ranges are reported up to a 2" convex radius . . . 4" concave radius . . . on up to a 10" wheel.

Harig Mfg. Corp., 5757 W. Howard St., Chicago, Ill.

Use postpaid card. Circle No. 106

## Heat Reflective Safety Clothing

Made of a new asbestos fabric called Silvabestos, the lightweight clothing is said to wear 168% longer than clothing made of regular asbestos fabric. A protective coating provides great protection against splash and heat transmission.

The complete line consists of gloves and mittens, sleeves, coats, pants, hoods, coveralls and overalls, cape sleeves, bibs and aprons, leggings and spats.

The line of clothing is recommended for open hearth operations, heat treating and similar exposures.

American Optical Co., Safety Products Div,, Southbridge, Mass.

Use postpaid card. Circle No. 107


# "We Cut Form Grinding

***COMPLEX GRINDING WHEEL FORMS ARE PRODUCED IN MINUTES . . .*** *by simply traversing the tracer lightly over an easily made template. A 10-to-1 ratio between template and truing diamond insures work accurate to "tenths."*

**WRITE NOW FOR FREE PRODUCT LITERATURE . . .** and see for yourself how a P&W Diaform Attachment can bring new speed, precision and economy to your form grinding operations. Just fill in and mail the handy coupon.

# Time OVER 33% . . .

## Using P & W Diaform Wheel Forming Attachments," says The B. JAHN Company.

Using Pratt & Whitney Diaform Wheel Forming Attachments, the B. Jahn Company, Inc. of New Britain, Conn. now form-trues grinding wheels—accurate to .0002" or better—*in minutes!* As a result, average time for producing the high-precision contoured punches and dies, which this company supplies to the aviation industry, has been cut 33%. Costs have been cut proportionately and busy machines released for other work. B. Jahn also likes the Diaform's *portability*, light weight, low initial cost and easy operation. As B. Jahn's chief engineer states, "We can take a man—and don't have to take our most experienced man—and in no time at all have him turning out precision work that is *better* than the old timers could *ever* do by other grinding methods."

**PRATT & WHITNEY COMPANY**
INCORPORATED
**6 Charter Oak Boulevard, West Hartford 1, Connecticut**

*Please send my free copy of P & W Diaform Circular No. 543-3.*

NAME _____ POSITION _____

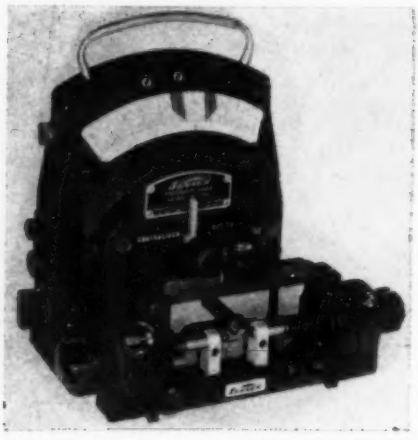
COMPANY _____

CO. ADDRESS _____

CITY _____ ZONE ___ STATE _____

NEW EQUIPMENT *continued*

## Precision Gage and Size-Setting Fixture



The measuring instrument is reported to show absolute size to a fraction of a tenth, and its range is from ⅜" to 1½" diameter.

Sizes to the nearest thousandth of an inch are "dialed-in" by turning two knobs on the setting fixture. This size is then transferred into the gage. Tenths or fractions of a tenth are set directly on the gage scale which is graduated in 50 millionths of an inch.

Sunnen Service Corp., 7910 Manchester Ave., St. Louis 17, Mo.

Use postpaid card. Circle No. 108

## Cast Steel Wheels Peened, One a Minute

The Wheelabrator special cabinet removes heat treat scale from cast steel railroad wheels, and at the same time peens the surface to an attractive lustre. According to the announcement, this was accomplished in only one minute per wheel.

Wheelabrator Corp., Mishawaka, Ind.

Use postpaid card. Circle No. 109


*Never before a honing machine like this new Model "AM" by Superior . . .*

A new equipment that will help all plants shorten honing time, achieve a better finish on most types of metals, hard or soft, and realize much longer stone life.

Combines the rugged dependability and economical precision and speed which make it ideal for production runs, tool room work and salvage operations.

The only single machine which affords infinitely variable speeds of from 250 to 1400 rpm. Sealed ball bearing spindle. Tachometer permits accurate speed setting. Dial indicator available. Large disc clutch and disc brake.

An exclusive feature is the 14-gallon capacity coolant tank which is removable for easy cleaning. Coolant tank, drive, and ½ H.P., 110-volt, 60 cy., single phase motor completely enclosed in heavy steel base which has louvered cover to provide ample ventilation.

Employs standard V-belt drive and provides automatic tensioning. The filter tray has three settling baffles and burlap filter. Overall size only 48" high, 28" wide and 36" deep. The top is formed into a convenient tray.

Universal adjustment of light. All on-off switches are mounted on the front of the machine for maximum convenience.

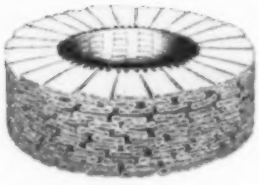
*"You get so much more when you get Superior Honing Machines"*

Send today to Honing Headquarters for literature and prices.

**SUPERIOR HONE CORPORATION**

1637 ELRENO STREET ELKHART, INDIANA


## Treatment on Sisal and Cotton Buffs



The Golden Treatment has proven beneficial on all types of cotton and sisal buffs manufactured by the firm for every operation in the metal finishing industry.

By strengthening and binding fibres together, the treatment is said to add firmer body and prevent fraying. In both cotton and sisal, firmer body gives harder, faster cutting action, non-fraying, scratch-free, no-streak finishing.

American Buff Co., 2414 S. LaSalle St., Chicago 16, Ill.

Use postpaid card. Circle No. 110

## Rotary Selector Switches Provide Various Sequences

A series of compact rotary switches, capable of switching high currents in an "almost unlimited number of sequences," is available.

Assemblies, called the 20AS Series, for the basic switching units, are grouped in two rows on either side of the camshaft, resulting in space saving and greater rigidity, the company says.

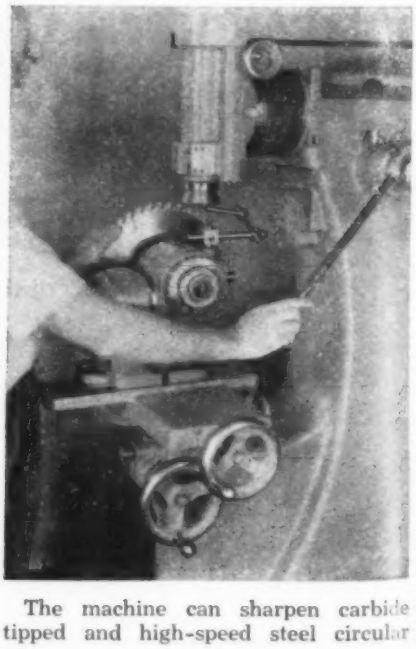
The assemblies are available with 4 through 20 single-pole double-throw basic switching units.

Micro Switch, Div. of Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Use postpaid card. Circle No. 111

## Sharpen Your Own Saws

Wood and metal working plants using circular saws can save money by doing their own sharpening. A major tool for this purpose is the Oliver ACE grinding machine.



The machine can sharpen carbide tipped and high-speed steel circular

saws, face mills, reamers, hobs, spot facers and other tools. It is simple to set up and use.

Oliver Instrument Co., 1442 E. Maumee St., Adrian, Mich.

Use postpaid card. Circle No. 112

## Air Cylinders for Pressures of 150 PSI Max.

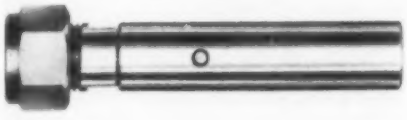
Consisting of 23 different models, each in 10 bore diameters, the Squaremaster cylinders are recommended for air pressures of 150 psi maximum and oil pressures of 500 psi maximum.

The precision honed brass tubing is said to minimize friction and wear. Bronze floating-cushion bushings provide smooth operation, and built-in check valves provide smooth, instantaneous reversal.

Rivett, Inc., Brighton 35, Boston, Mass.

Use postpaid card. Circle No. 113

## Double Pin Floating Holders



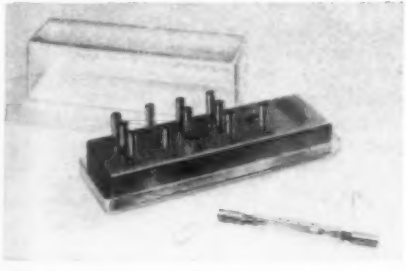
The holders feature pins located at right angles to each other permitting pivoting about the point of contact to adjust for angular misalignment. Should wear occur, the point of contact is renewed by rotating the pins.

Units are available in two basic styles: with straight (pictured) or taper shanks, each of the collet or brushing type.

Erickson Tool Co., 34350 Solon Rd., Solon, Ohio.

Use postpaid card. Circle No. 114

## Precision Gage Sets



Tenth-incremental gages for each nominal fractional size range from 1/16" to 1" diameter. All gages are of taper-lock design, ground between centers, and lapped to a fine micro-inch finish. Reversible gages up to ⅜" dia. available on request.

Gages are made in two standard accuracies: Class XX—from size to plus 20 millionths; Class X—from minus 20 millionths to plus 40 millionths.

The precision gage sets are used as Go and NoGo gages to check hole sizes, and as an aid in set-up and operation of machine tools used in sizing holes.

K & K Gage Div., K & K Grinding Co., 230 Richardson St., Brooklyn 22, N.Y.

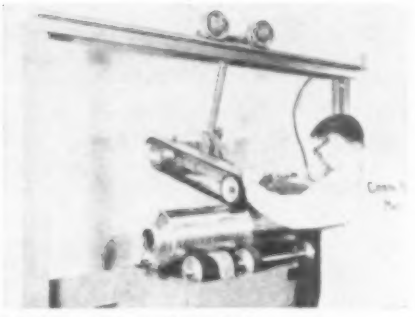
Use postpaid card. Circle No. 115

## Belt Unit on Grinder

The 6-72 abrasive belt grinder unit is suspended above powered rollers. A variable speed motor regulates the rotation of the cylinder while the operator moves the grinder across the part. Contact wheel grinding provides the aggressive cut needed for removing excess weld. The slack of belt produces an excellent finish quickly and economically according to the announcement.

The belt unit is frequently used as a component for making machines, either as a primary part or an auxiliary part of the machine.

Grinding & Polishing Machinery Corp., 2530 Winthrop Ave., Indianapolis 5, Ind.



Grinding a water softener tank.

Use postpaid card. Circle No. 116


# ATLANTIC WHEELS

## float through the roughest jobs...

**Even on the toughest** flash and weld removal operations, you can depend on Atlantic Grinding Wheels for fast, cool, clean-cutting action. Made with a special resinoid bond to withstand high centrifugal forces and assure maximum safety, they have a smooth, floating action that calls for less pressure on the grinding surface . . . helps reduce operator fatigue and increase efficiency.

**If you have any type** of metal removal or smoothing problem, it will pay you to give Atlantic Grinding Wheels a trial run. An Atlantic representative will be glad to recommend the right wheel for your specific requirements. Write for details and a copy of the Atlantic Grinding Wheel Catalog. Atlantic Abrasive Corp., **532** Pearl Street, So. Braintree, Mass.

## Atlantic Abrasive Corp.

A DIVISION OF ABRASIVE PRODUCTS, INC.

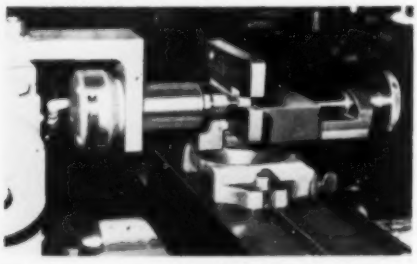
South Braintree 85, Massachusetts

STRAIGHT WHEELS • CYLINDER WHEELS • CUP WHEELS

CONES • PLUGS • MOUNTED WHEELS AND POINTS

## Air Turbine Grinder with Left Hand Rotation

An air turbine grinder is now available with left hand rotation for mounting on milling machines or machine



grinders. Since the left hand rotation is in the same direction as standard machine grinder spindle rotation, any standard dust collection set-up may be used with the tool.

Applications of the DIA-LH grinder include slot and depth grinding, tool chip breaker grinding, and cutter sharpening. The grinder operates at 50,000 rpm at the low air consumption rate of only 8 cfm. Its ¼ hp. is ample for any work resistance with grinding wheels up to ½" dia.

The unit is built with prelubricated, grease shielded ball bearings, preloaded to control end play to a 0.0002" tolerance.

Onsrud Machine Works, Inc., Portable Tool Div., 7736 Lehigh Ave., Niles 31, Ill.

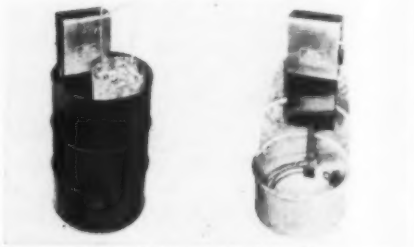
Use postpaid card. Circle No. 117

## Portable Degreaser

The Manpro Bar-L vapor degreaser's smooth exterior and thin front-to-rear dimension permits use of any standard metal barrel for on-the-job metal cleaning. It is reported to have a 700 lb. per hour capacity for steel parts.

Manpro Corp., 1396 Hilton Rd., Detroit 20, Mich.

Use postpaid card. Circle No. 118



**Manpro Bar-L with work basket. Also, cutaway showing Bar-L with vapor condenser.**

## Press-On Wheel

The tire of the press-on type Disowheel incorporates the polyurethane elastomer, Disogrin. The load-carrying capacity has been rated to be from 2½ to 4 times the capacity of rubber, according to the manufacturer. This feature enables the wheels to stand up under stationary heavy loads without developing appreciable flats. A low rolling resistance feature is said to reduce the amount of power consumed.

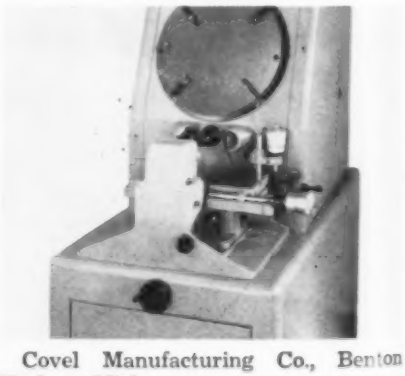
Disogrin Industries, Inc., 510 So. Fulton Ave., Mt. Vernon, N.Y.

Use postpaid card. Circle No. 119

## Optical Comparator Has Micrometer Measuring Screws

The No. 14 Covel optical comparator is arranged with micrometer measuring screws, instead of dial indicators, for the purpose of taking direct measurements. The micrometer screws are an optional feature for those customers preferring them rather than the dial indicators.

The new improved model is arranged with surface illumination and a precision plastic deep-etch protractor screen and vernier.



Covel Manufacturing Co., Benton Harbor, Mich.

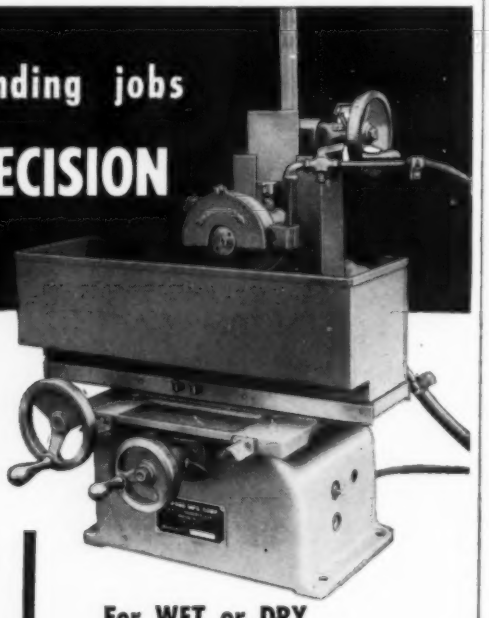
Use postpaid card. Circle No. 120


to do small grinding jobs

to MICRO-PRECISION FAST...

you need the

SANFORD Model SG SURFACE GRINDER



This unrivalled small parts grinder can be depended upon for micro accuracy. It's easy to use too . . . every hand wheel and operating switch is at your finger tips.

Designed and built by engineers and tool makers of rare foresight for tool, die and gage work, it has been constantly preferred after these many years of proven worth.

Write for fully illustrated literature, replacement parts and special attachments data with price list.

**For WET or DRY grinding, specify optional equipment.**

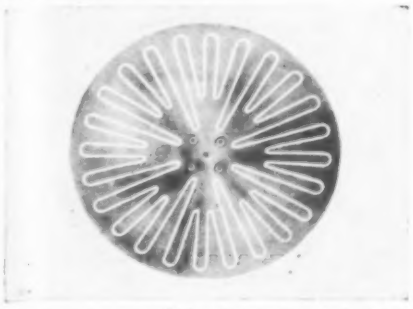
PARTIAL SPECIFICATIONS—

Chuck Surface—3"x5" or 4"x6".
Table travel—8", traverse 4".
Vertical head movement—6".
Work area under 4" wheel—6", with chuck—4".
Standard grinding wheel—4" x ⅜" x ½".
Spindle speed—approx. 5500 RPM.
Motor, 1/6 HP, single or 3 ph., dynamically balanced.
Dimensions—23"x30"x27" high.
Net wt. approx. 160 lbs.

*Representatives in major industrial areas*

SANFORD MANUFACTURING CORP. 1026G Commerce Ave., Union, N. J.

## Rotary Magnet Gives Great Magnetic Holding Power



The purpose of the Crow Foot design, in the electro rotary magnet, is answered in its radial pattern and the maximum number of radial lines that can be accommodated on the magnet face. More radial lines mean more magnetic holding power, more holding torque.

Although designed for grinding, the rotaries are in successful operation holding J 79 jet engine parts for turning on Bullard Cutmasters and Monarch T lathes. Sizes range from 10" dia. through 24" dia.

Magnetic Holding Devices, 2034 E. 22nd St., Cleveland 15, Ohio.

Use postpaid card. Circle No. 121

## Oil Filters Protect Thread Rollers

Engineered filtering of lubricating and coolant oils for custom designed thread rollers is said to assure exacting quality control and facilitates rolling close tolerance threads and worms on studs, bar stock and special components up to 4½" dia. This is the report from the R.E.C. Corp., New Rochelle, N.Y., specialists in the manufacture of stud bolts and threaded rods.

Replacement cartridges are installed at the plant approximately twice a week after about 10 lb. of sludge (iron, steel, brass, bronze, etc., filings) have collected in the Fram filters.

The filter cartridges are said to possess an unusually high dirt retaining capacity, and maintain initial high filtering efficiency throughout their long life.

The Fram Corp., Providence, R.I.

Replacing cartridge in Fram filter on Reed cylindrical die thread rolling machine at R.E.C. Corp. is Mel Moliterno, shop foreman.

Use postpaid card. Circle No. 122

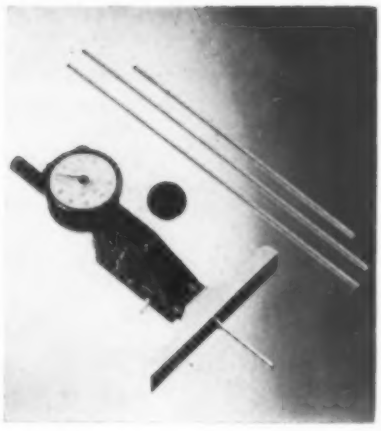
## Adjustable Depth and Groove Location Gage

The Mueller gage is designed to locate a groove, and also measure the width of the groove in one setting. The width of the groove can be read directly off the indicator.

The measuring rods, in lengths of 3", 4" and 6", are made of hardened drill rod and perfectly finished. One end is flat and lapped. The opposite end has a radius. Diameter is .125".

Mueller Laboratory, 1052 N. Allen Ave., Pasadena, Calif.

Use postpaid card. Circle No. 123




INCREASE CENTERLESS GRINDING PRODUCTION

200%, Yes— 300%

WITH THIS NEW AUTOMATIC INFEED GRINDING ATTACHMENT

Utmost precision in grinding and duplicate sizing. Sizing dial is graduated in (.00001) one hundredth of a thousandth of an inch. No hydrocheck to change feed rate when oil is cold. No checking of oil level or refilling of hydrocheck. Three (3) different feed rates are available in one unit for the fastest, most efficient, and precise sizing in a centerless grinder.

CAN BE USED FOR TRU-FEED AS WELL AS INFEED

for close sizing. Ideally located push button control station consists of Stop-Button, Start-Button, Caution Pilot Light, and a selector switch for set up or auto grinding positions. CATALOG Write for it today!

MODERN DEVICES

Subsidiary of TWENTIETH CENTURY MFG. CO.

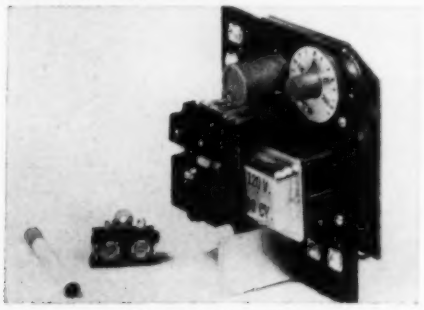
FEEDCISION

Box 429 GF Libertyville, Illinois

Open Territories for Manufacturers' Representatives

## NEW EQUIPMENT *continued*

### Transistorized Amplifier Relay System



Compact amplifier (right), and mounting with thermistor center.

The temperature controller provides remote control of temperatures in a variety of applications in the plastics, machinery, rubber, lumber, packaging and other industries.

The system includes a compact transistorized amplifier, and a vibration-proof mounting containing a thermistor center.

Thermistor mountings, which can be located as much as two miles from the amplifier relay, are available in a variety of sizes and shapes.

The system is priced at $59.60.

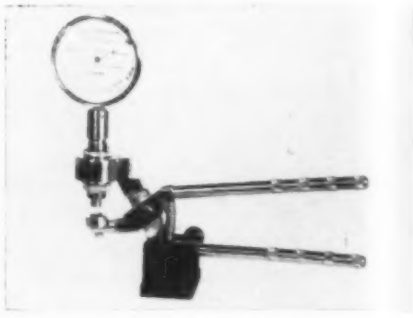
Minneapolis-Honeywell, Control Device Div., 2747 Fourth Ave. So., Minneapolis, Minn.

Use postpaid card. Circle No. 124

### Hardness Tester

Portable Oppel hardness tester supplies readings directly in Rockwell 30-T units, popular for can materials. It was designed for the precision testing of thin sheet metal for cans, during the manufacturing process or on stock. It is operated by a plier arrangement as illustrated.

The measuring tolerances are [illegible], 5 R-30-T. This accuracy is said to be warranted by both a precision-made instrument, and precision test blocks for calibrating and adjusting, delivered with the tester.



Company for Technical Progress, Cincinnati, Ohio.

Use postpaid card. Circle No. 125

### Air Cylinder With Built-In Solenoid Valve

Bimba throw-away type stainless steel bodied air cylinder with built-in electric solenoid valve is available. The 1-1/16" bore, 1", 2" and 3" stroke complete work units consist of a low cost, single acting, spring return cylinder, with 3-way 115 volt solenoid control valve built on the end of the cylinder.

The cylinder body is a mirror finish stainless steel stamping, and all units contain vinyl "U" cups mounted in aluminum alloy piston.

The maximum operating pressure is 150 psi. Models are priced from $20.95 to $22.95.

Bimba Hardware & Mfg. Co., 103 Main St., Monee, Ill.

Use postpaid card. Circle No. 126

### Finishing Machine for Metal Components

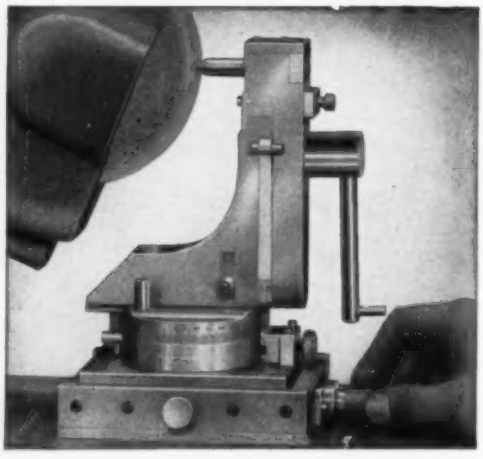
Eight-spindle unit, operating on a four-minute cycle with one part fixtured to each spindle, produces 120 finished pieces per hour. One operator handles all controls from one control station.


**Tough Grinding Wheel Forms Dressed Easy as A, B, C**

**eliminate elaborate set-ups and operations**

**.0001" ACCURACY**

*Fluidmotion*
**WHEEL DRESSERS**
dress two angles tangent to a radius in one continuous motion



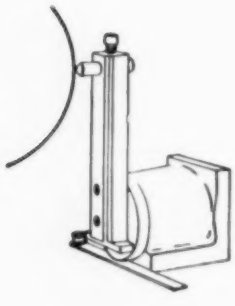
With the unique "Fluidmotion" Dresser, you can dress two angles tangent to a radius — using one handle in one continuous motion. Operation is so fast and simple that beginners can use them.

Adaptable to all type cylindrical and surface grinders.

A. Obtain micrometer reading; add required convex radius or subtract required concave radius.

B. Loosen jib with wrench and "mike" over lower pins to reading obtained above.

C. Tighten jib. Set stops for two angles. Ready for action.



Also available: "FORM MASTER" Dresser, capable of dressing any radii up to 12" convex, up to 15" concave.

See your industrial distributor or write for free literature.

J&S TOOL CO. INC. — NEW CLAMPS • PRECISION VISES • BOWN HOLDING DEVICES — CLAMPCUT

J & S TOOL CO., INC.
880 DORSA AVE.
LIVINGSTON, NEW JERSEY

The Roto-Matic, used primarily as a deburring unit, has the finishing advantages of polishing and surface improvement, fine micro finish of 3 to 4 rms, and stress relief. The machine uses a fine abrasive media—normally between 8 and 14 mesh. Stress risers in the metal are eliminated during the normal deburring time cycle.

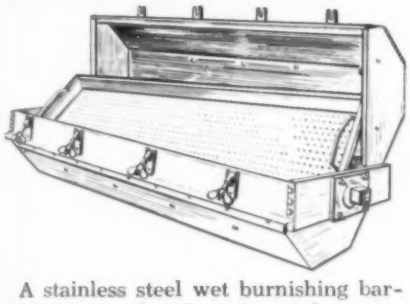
The standard machines are equipped with four, eight, or sixteen spindles and time cycles range from a few seconds to six minutes.

The unit is being used to finish parts as refrigeration compressor components, jet engine blades, and steering knuckles.

Roto-Finish Co., Kalamazoo, Mich.

Use postpaid card. Circle No. 127

## Burnishing Barrel Unloads in 30 Seconds



A stainless steel wet burnishing barrel is equipped with an integral screening device that permits the separation of finished work from media in 30 seconds.

With the unit, it is not necessary to remove the barrel from the tank of burnishing solution in order to separate finished parts.

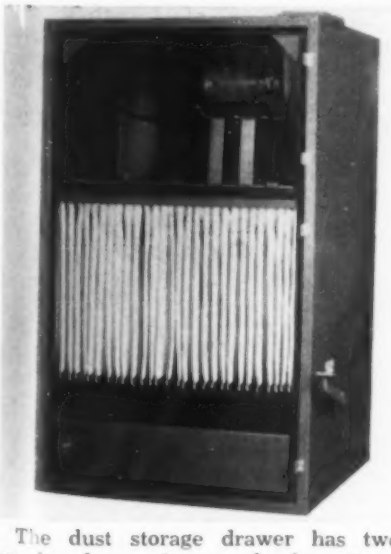
Barrels are available in sizes ranging from 8"x9" up to 20"x40".

Tumb-L-Matic, Inc., St. Mary's St., Stamford, Conn.

Use postpaid card. Circle No. 128

## Major Change in Filter Collector

A modification of the Torit Model 75 cabinet cloth-filter dust collector is said to greatly improve the filtering efficiency and reduce maintenance. This is because of a larger filter area and increase of dust storage space.



The dust storage drawer has two cu. ft. of capacity, nearly four times that of previous model. There is no increase in price on the improved model.

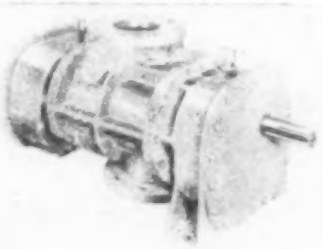
The unit provides a four-to-one ratio of moving air to filter area with 150 sq. ft. of cloth filters to a maximum 600 cubic-feet-per-minute of air to be cleaned, according to the announcement.

Torit Mfg. Co., 287 Walnut St., St. Paul, Minn.

Use postpaid card. Circle No. 129

## Blower-Compressor With Efficient Rotor Forms

The CycloBlower is reported to eliminate the effect of runout or trapped pockets by interrupting continuity of rotor seals without sacrificing the advantages of perfectly symmetrical rotor forms. The compact axial flow, positive displacement blower-compressor allows increased water rates for wet compression or vacuum service, and eliminates shock, temperature and loading due to buildup of pressure, according to the firm.



The rotors do not touch. Hence there is said to be no wear, and no need for lubrication within the compression chamber. This assures clean air or gas delivery.

The unit is available in eight models from speeds of 1800 rpm to 2400 rpm.

Air Appliance Div., U. S. Hoffman Machinery Corp., 103 Fourth Ave., N.Y. 3, N.Y.

Use postpaid card. Circle No. 130


# DON'T GET LOST in the "PROFIT SQUEEZE"!

**New slants to save your time, cut your costs, improve your product quality**

Now is the time to look into Brightboy's unique action in metalworking. Break the profit squeeze with Brightboy, improve your product at a lower cost.

*Abrasive and rubber function simultaneously* to BURR, CLEAN, FINISH, POLISH, in a single step, time saving operation. No muss, no fuss! A Brightboy finish frequently constitutes the final polish—definitely improves product quality.

In Brightboy's wide range of STOCK grains and textures you have exact selection of an abrasive JOB-MATCHED to your work. Aluminum Oxide and Silicon Carbide grains come in grades from extra fine to extra coarse, in soft, firm and tough rubber binders; take the place of "special" compounds; prove their versatility on regular as well as special finishing.

Made in WHEELS, STICKS, RODS and BLOCKS for machine and manual applications. Ask your dealer to recommend the Brightboy numbers for your needs, and for the Brightboy catalog listing applications and machine speeds. Write for "Notes From The Brightboy Service Engineer" describing cost-saving Brightboy applications and uses.

WRITE FOR FREE SAMPLE
BRIGHTBOY HAND PIECE
for quick-job cleaning

BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street Newark 7, N. J.

**TIME-SAVING FEATURES**

Works to close tolerances
Can be shaped to contour
Produces conventional and special finishes and patterns, frequently the final polish
No before-use preparation or dressing
No skilled labor required

**GENERAL USES**

Removing light digs, tool and heat marks
Cleaning welded and soldered joints
Burring and finishing castings, stampings, machined and molded parts
Maintenance of tools and machinery

WELDON ROBERTS
Brightboy
RUBBER CUSHIONED ABRASIVES

*America's Pioneer Manufacturer Of Rubber-Bonded Abrasives*

NEW EQUIPMENT *continued*

## Tooth Clutch Has High Torque Transmission

The form-locking principle of the McCauley electro-magnetic tooth clutch, which is used to transmit the torque, incorporates features as: absolutely no idle torque, engagement up to 300 rpm relative speed, and disengagement under full load while running at maximum rpm.

In operation the clutch has been shown to have extremely high torque transmission with reference to over-all dimensions. Clutches are available with torque ratings from 40 to 4000 ft. lbs.

McCauley Industrial Corp., 1840 Howell Ave., Dayton 17, Ohio.

Use postpaid card. Circle No. 131

## Anti-Seize in Polyethylene Tubes

Manufactured by Bel-Ray Co., Inc., Madison, N.J., Molylube Anti-Seize,

Bolts are treated with Anti-Seize to prevent galling under heats up to 600° F.

a stable, non melting, multi-purpose lubricant, has a great capacity to prevent seizing and galling at pressures over 100,000 lb. per sq. in.

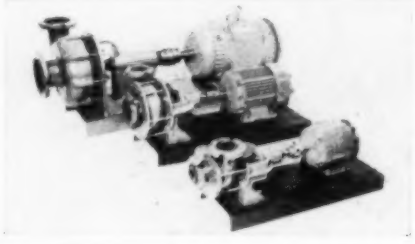
The product is available in 3-oz. Bracon polyethylene tubes, designed by the Bradley Container Corp. They are internally coated to prevent ingredients from drying up.

Bradley Container Corp., Maynard, Mass.

Use postpaid card. Circle No. 132

## Rubber-Lined Centrifugal Pumps

The rubber lining of the pumps is



suitable for all alkalines and acids except nitric or chromic at temperatures to 210° F. The Camac centrifugal pumps cover the range from 10 to 1200 gpm at heads from 15′ to 120′.

The pumps, from ½ hp to 20 hp, are so constructed that no metal is in contact with the acid being pumped. The pumps can be disassembled for repair without disturbing piping. Pictured is the complete line of the pumps.

Carl Buck & Associates, Essex Fells, N.J.

Use postpaid card. Circle No. 133

## Hand Knob Fixture Clamps

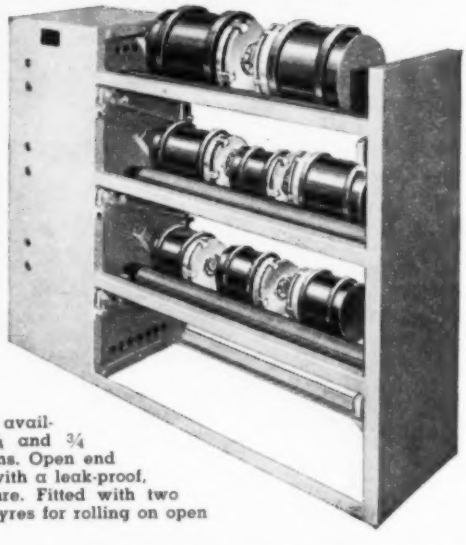
The manufacturer is adding hand knob fixture clamps to its line of jig and fixture details.

The clamps will be furnished in a variety of sizes with ¼, 5/16, ⅜, ½ and ⅝" studs. Several lengths of clamp straps are available for each size except the ¼". The clamp straps and studs are hardened high tensile steel.

Harco Engineering, 12092 Woodbine Ave., Detroit 28, Mich.

Use postpaid card. Circle No. 134


## cut barrel finishing costs on small batches



Here is a new type of barrel for de-burring, descaling and burnishing small parts in small batches. The barrels are made of rubber-resin in chemical combination, a material with the excellent properties of toughness with lightness and resistance to wear and corrosion.

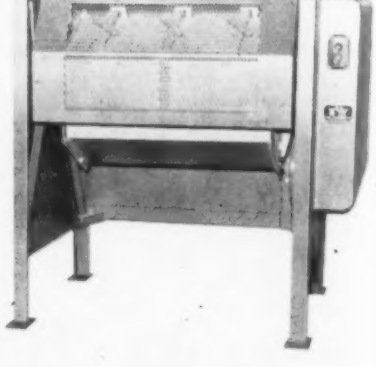
The barrel sizes available are 2½, 1¼ and ¾ nominal U.S. gallons. Open end of barrels sealed with a leak-proof, quick-release closure. Fitted with two solid rubber-resin tyres for rolling on open rolls.

The barrel finisher shown consists of three sets of rolls arranged in three tiers, each set consisting of a driven roll and an idler roll. Each tier driven by a separate motor or, if required all three can be driven by one motor. The idler roll is adjustable to take the different barrel diameters and various combinations of barrel sizes can be rolled at the same time such as six 2½-gallon or two 2½-gallon and four 1¼-gallon or six 1¼-gallon or nine ½-gallon.

*Write for details and descriptive leaflet today*

**PASCALL** THE PASCALL ENGINEERING COMPANY LIMITED GATWICK ROAD CRAWLEY • ENGLAND


## Tumble-Barrel Finishers Have Interchangeable Compartments



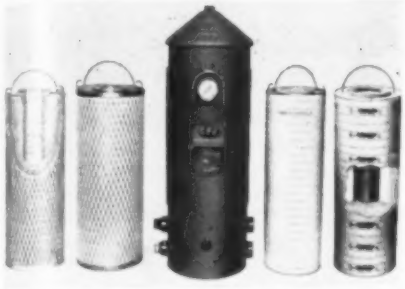
Models V4 and V6 finishers have 4 and 6 cu. ft. barrels with two or three interchangeable compartments respectively. Both models have 23 rpm fixed speed drive, or an optional 12 to 36 rpm variable speed drive. Semi-enclosed cabinet design gives adequate protection.

Features include orange-colored no-seam vinyl barrel linings, direct chain and sprocket drive, and a selection of timing and control accessories.

Rampe Manufacturing Co., 14915 Woodworth Ave., Cleveland 10, Ohio.

Use postpaid card. Circle No. 135

## Filter Has Interchangeable Cartridges for Hydraulic Fluids



The latest CFC Honan-Crane filter features two interchangeable cartridges. The Flo-Pac 5 removes solid contaminants down to 5 microns in one pass. Type K cartridge utilizes Type T Cranite (fuller's earth) for removal of solid and dissolved contaminants.

Flo-Pac 5, with 6300 square inches of filtering surface, will not disintegrate or be affected by water or water solutions. It is designed for water-base hydraulic fluids, refined fuels, and on any type of mineral oil.

The new Type K Cranite cartridge, containing approximately 13 lbs. of special Type T Cranite (fuller's earth) enclosed in a metal container, removes water, acids, and solid contaminants.

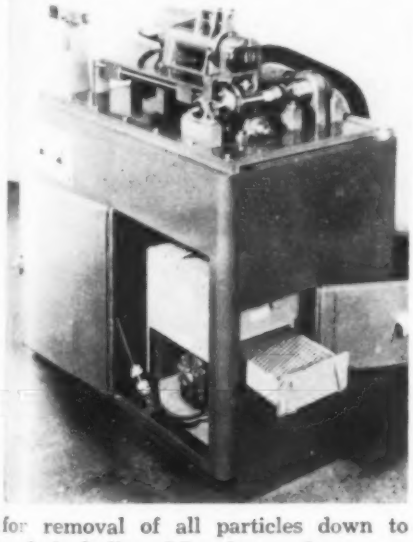
Indiana Commercial Filters Corp., Lebanon, Ind.

Use postpaid card. Circle No. 136

## Dust Collector With New Wire Stripper Design

In developing intermittent wire stripper for Torrington Mfg. Co., the Eraser Co., Inc., Syracuse, N.Y., has provided answers to both the dust collection and floor space problems. The machine was designed for inclusion of Dustkop Model 335, air recirculating dust collector produced by Aget Mfg. Co.

For the purpose of removing dust from any light grinding or buffing operation, the unit, in 46 standard models, uses a special fiber glass filter



for removal of all particles down to and including 0.5 micron size.

Aget Mfg. Co., Adrian, Mich.

Use postpaid card. Circle No. 137

## Job Designed Keyboards

Keyboard models, available with any number of keys, from portable hand-sized units to desk-type models, and with the number of digits and letters tailored to customer's specification, are now obtainable. They are designed for application for computer programming, computer input, and uses as control of business machines, laboratory and process equipment, punch tape devices, etc.

Each key will operate as many as two normally opened and two normally closed contacts simultaneously, and thus either can be used to control two

separate circuits, or wired in parallel to insure good service under abnormal conditions.

Concord Control, Inc., Boston, Mass.

Use postpaid card. Circle No. 138

## Wire Rod and Bar Stock Cleaning Machine

A series of special cabinets is now available for descaling wire rod and bar stock. These machines make it possible to automate blast cleaning and cold drawing, cold heading, or patenting into one continuous operation. They can handle single strands at speeds up to 600 f.p.m.

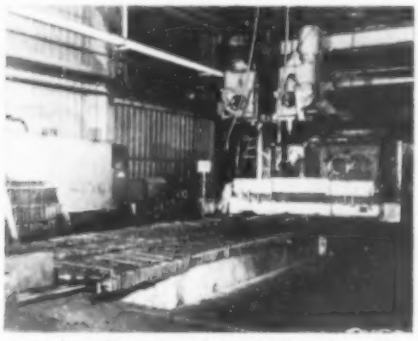
Wheelabrator Corp., 1169 S. Byrkit St., Mishawaka, Ind.

Use postpaid card. Circle No. 139

## Way-Protection for Long Tool Beds

Through improved designs that provide for the integration of aluminum bridges into the convolutions of neoprene-base materials, it now is possible to fabricate way-protection for the largest tool beds.

Fictured is a way-protector covering the full 80" width of the bed on a hori-



zontal, milling and boring machine. The way-protectors open to 90° on both sides of the column and close to 24".

Extending off the tool bed ends are vertical sheaves to receive the supporting cables as the tool bed travels back away from center position.

A & A Mfg. Co., Inc., 712 S. 12th St., Milwaukee, Wis.

Use postpaid card. Circle No. 140


Now ANGLE TANGENT TO RADIUS WHEEL DRESSING WITH NEW VERSATILE TOOLS

MIGHTY GOOD AT ANY PRICE BUT TOPS AT ONLY $149.50

*(Both tools including diamonds)*

The G-5 RADIUS DRESSER is a precision engineered tool that will dress either a convex or a concave radius from .015" to 1.750" on a 7 inch or 10 inch wheel, and it may be set to the exact radii desired. Graduated stops allow you to dress any desired portion of a radius. The spring tension journal insures chatter free operation. The G-2 ANGLE DRESSER AND TOOL HOLDER is actually two tools in one, having an easy to read vernier scale 0° to 180° giving accuracy within 2" of 1°; an excellent time saver to set up small jobs to be milled, drilled, tapped, etc., on any desired angle.

*Our fixtures will dress most radii and angles tangent to each other, similar to those shown below.*

FREE handsome, wooden storage box. Write for complete information.

PURCHASE EITHER TOOL SEPARATELY

Now you can purchase either the G-5 Radius Dresser or the G-2 Angle Dresser and Tool Holder separately if you so desire. (Without storage boxes)

G-5 Radius Dresser complete with diamond $80.00.

G-2 Angle Dresser and Tool Holder complete with diamond $87.50.

Replacement diamonds are always available for our units at a reduced price. Diamonds for the G-2 $5.00 each; diamonds for the G-5 $8.00 each.

Distributorship available in select territories

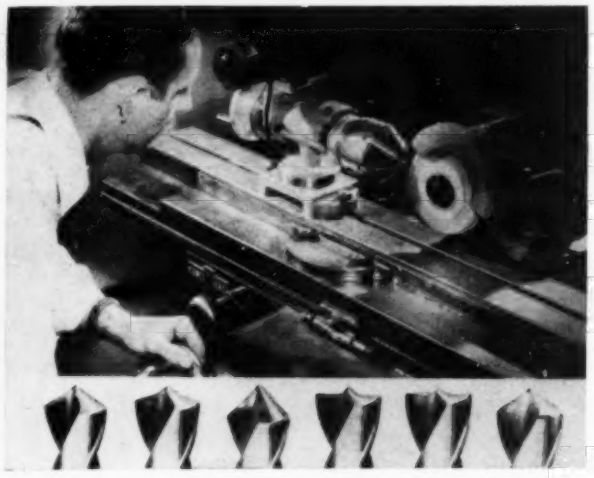
ROTHFUSS TOOL COMPANY

BOX 2696, ELMWOOD STATION PROVIDENCE 7, R. I.

## Drill Point and Relief Grinding Fixture

The Helixpoint drill point can be produced on a production basis on the Steptool relief grinding fixture which fits any surface, tool, or cutter grinder.

The main advantage claimed for the drill point lies in the self-centering action, a "built-in center drill" which has no tendency to "walk." The drill remains steady in the hole as drilling progresses, offering no side displacement, which results in round, accurate holes free from "bell mouth." Free sheer cutting action is also claimed for the drill point. Hole accuracy is improved due to centering action and the precision accuracy ground into the point on the fixture. Lip concentricity and indexing can be held within .0003", which results in even cutting action and fine finish in holes free from marks. The grinding fixture and grinding technique permit a variety of Helixpoint configurations and clearance angles.



Drills from .0135" diameter through 1-1/16" diameter can be sharpened with the drill points in collets in the relief grinding fixture. The fixture grinds core drills, step drills, taps, countersinks, steptools of any number of flutes, and either right or left hand.

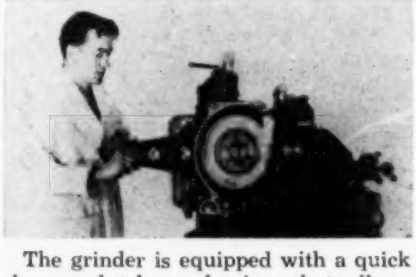
Steptool Corp., 3613 E. Olympic Blvd., Los Angeles 23, Calif.

Use postpaid card. Circle No. 141

## Crush Dresser Mounted on Centerless Grinder

A permanently mounted crush dresser is available as special equipment on the TG-12 centerless grinder. The dresser makes it possible to grind multiple diameter parts and intricately shaped profiles, from miniature type to 3" in length and 1" in diameter.

The dresser need not be removed to convert from infeed or thrufeed grinding to form grinding.



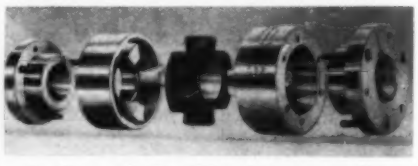
The grinder is equipped with a quick change clutch mechanism that allows the operator to quickly change from grinding speed to crushing speed and back again.

The crushing attachment is permanently affixed to the grinding wheel housing and yet, through micrometer adjustment, can be leveled and corrected in both planes. This permits rapid wheel and tool change-over and enables the operator to bring the crush roller into perfect alignment with the grinding wheel, thus minimizing tool wear and giving great accuracy.

Royal Master, Inc., State Highway 23, Riverdale, N.J.

Use postpaid card. Circle No. 142

## Flexible Drive Coupling



A line of flexible drive couplings, under the tradename Magnaloy, are made entirely of a magnesium alloy said to provide the strength of steel with an 80% reduction in weight. Low weight is valuable in minimizing vibration. The couplings are made vise-tight.

Made in eight size-steps, the couplings will accept from ¾" to 6" shafts.

Detroit Power Coupling Co., 992 W. Seven Mile Rd., Detroit 3, Mich.

Use postpaid card. Circle No. 143

## Diamond Cutting Wheel

A new development in diamond cutting wheels that will benefit the production of germanium and silicon transistors and rectifiers has been announced.

The wheels, called Diatronic, have diamond cutting edges that range in width from .006" with a tolerance of .0005".

For transistors and rectifiers, germanium or silicon crystals have to be cut into "dices" that are as small as one-tenth of an inch square and as thin as .0013". Loss of the silicon or germanium crystal, as sawdust, has been lowered.

Navan Products, Inc., 1318 Second St., Santa Monica, Calif.

Use postpaid card. Circle No. 144

## Precision Boring in the Palm of Your Hand

The A-1 miniature Deka-Bore boring head is a precision boring tool with an offset feature to compensate for tool grinds. It is only 2¼" in diameter, and 1-15/16" long, and weighs just 22 ounces.

The head will hold quills up to ½" in diameter. It incorporates the Deka-Dial, which permits positive .0001" adjustments without backlash. It also has a calibrated micrometer screw that can offset the tool slide to compensate for tool grinds.

Precision Tool Mfg. Co. of Illinois, 1305 S. Laramie Ave., Cicero 50, Ill.

Use postpaid card. Circle No. 145

## Precise Tolerance Protected By Rust Removing Compound

To protect the precise tolerances of highly precision-made components and tools, a rust and tarnish remover, Rustclean 154, has been perfected. Due to its inhibiting agents, it is claimed safe for use on even the thinnest cross-sections and delicate finishes.

Available in 55-gallon drums to one-pint case lots.

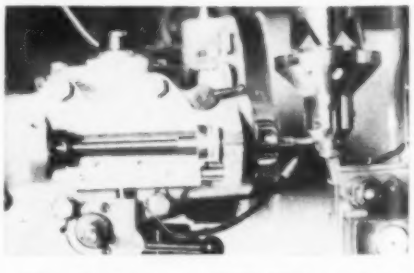
Octagon Process, Inc., 34 Bank St., Staten Island 1, N.Y.

Use postpaid card. Circle No. 146

## Spray Cooling Unit

The Spra-Kool Midget consists of a simple, adjustable ball check valve, small diameter plastic tubing, and a pencil-size brass spray nozzle. Easily set up, the system prevents build-up of soft metals, such as aluminum, on saws and other tools.

List price is $9.95 complete.

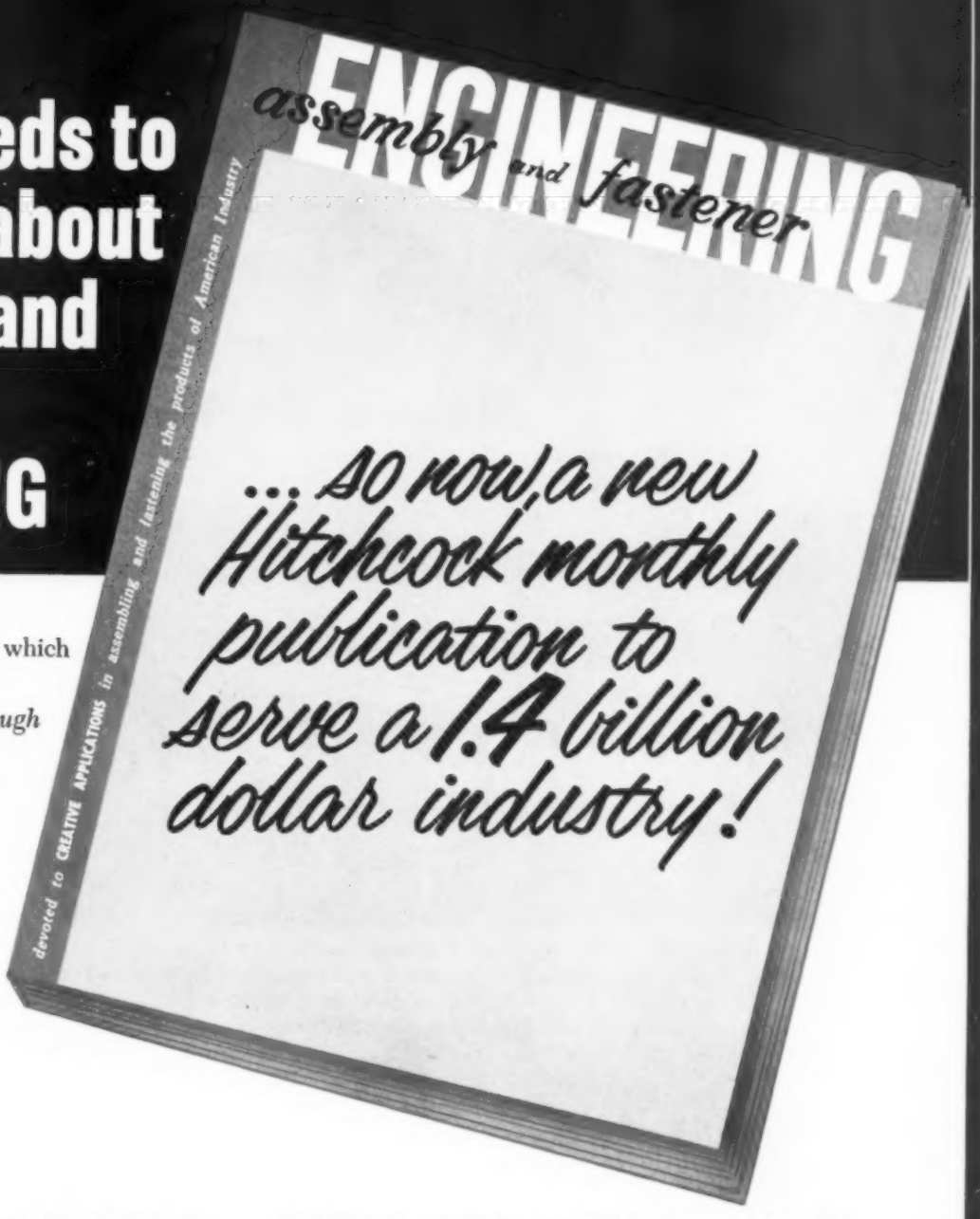


Bar Products Co., 3703 Highcrest Rd., Rockford, Ill.

Use postpaid card. Circle No. 147

*A Hitchcock conclusion:*

# Industry needs to know more about ASSEMBLY and FASTENER ENGINEERING


ENGINEERING
assembly and fastener
devoted to CREATIVE APPLICATIONS in assembling and fastening the products of American Industry
... so now, a new Hitchcock monthly publication to serve a 1.4 billion dollar industry!

Three years ago your men from Hitchcock started a conversation which ran something like this:

*Everything from automobiles through zithers have to be held together.*

*How much of the cost of making things is devoted to their assembly and fastening?*

*How many manufacturers use a creatively engineered fastener for their specific application?*

*How many buy fasteners on the basis of assembly cost and not on piece-part cost?*

*In short, what steps have manufacturers taken to reduce their assembly and fastening costs?*

The seed had been planted . . . Hitchcock had been noticing that the field of assembly and fastening throughout industry had been virtually ignored.
After three years of study and research, the idea germinated into a few basic premises . . .

- 50-75% of total manufacturing cost goes into assembly and fastening operations.
- There are several ways to reduce this cost.
- Industry should be shown HOW.
- There is no publication at present devoted to the little-noticed field of assembly and fastening.

The Hitchcock conclusion: a new monthly publication—ASSEMBLY and FASTENER ENGINEERING—to reach every major portion of this $1,400,000,000.00 market. To stress creative applications . . . discuss new methods . . . to EDUCATE MANUFACTURERS in decreasing assembly and fastening costs, in increasing profits.

CIRCULATION: in excess of 25,000 copies at the outset.
READERS: on the engineering level; will include design, process, method, production, manufacturing and standards engineers.
FIRST ISSUE: October 1958.

Plan now to advertise in the ONLY publication which can and will serve the important and growing assembly and fastener market. Write, telephone, or wire for further facts on ASSEMBLY AND FASTENER ENGINEERING.

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Machine & Tool Directory
Grinding and Finishing
Carbide Engineering

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Hitchcock's Wood Working
Hitchcock's Wood Working Directory

TRANSPORTATION

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Mass Transportation's Directory
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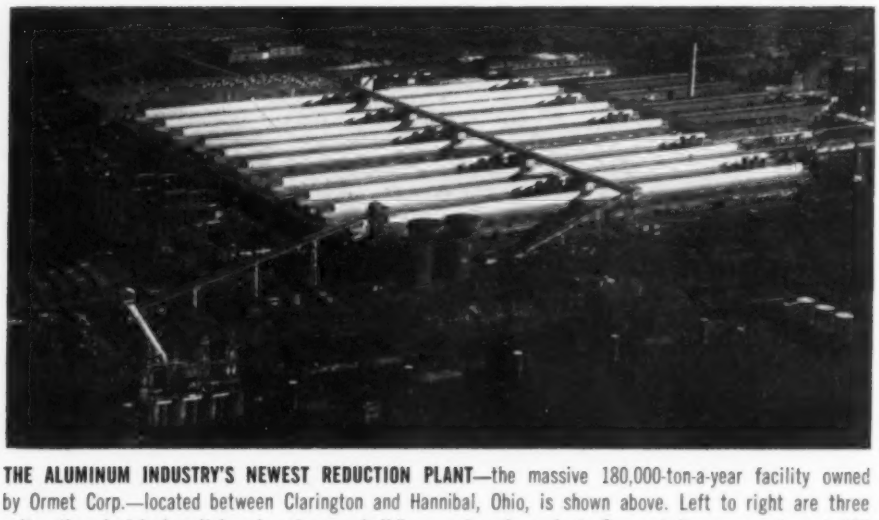
WHEATON, ILLINOIS
SINCE 1898

THE PIONEER OF CONTROLLED CIRCULATION

# News of Industry



**THE ALUMINUM INDUSTRY'S NEWEST REDUCTION PLANT**—the massive 180,000-ton-a-year facility owned by Ormet Corp.—located between Clarington and Hannibal, Ohio, is shown above. Left to right are three units—the electrical switchyard, pot room buildings and carbon plant. One pot line now puts out 100 tons of metal daily. The facility is owned jointly by Olin Mathieson Chemical Corp. and Revere Copper and Brass, Inc.

**A MASS RAY SPECTROGRAPH**, a part of the complicated machinery involved in the development of boron-based high energy fuels, is pictured. Full-scale production of the high energy fuels at the recently-constructed plant, located at Model City, N.Y., has now begun. The fuel will impart greater range and speed to future fighters, bombers and missiles. The plant was built by Olin Mathieson Chemical Corp. for the Navy.

## Du Pont's Laboratory for Customer Service

Opening of a new $5 million laboratory to provide service to customers and for evaluation of new or improved products of the Du Pont Co.'s Electrochemicals and Pigments Departments has been announced.

Although some facilities are shared jointly by the two departments, the building houses separate laboratories for product development in the paint, metals, textile, plastics, paper, ink, and allied chemical fields.

For both departments, the laboratory provides a center for research work on problems of customers, for customer visits, development work on new products, and training of field technical representatives.

## Markings for Identifying Grinding Wheels

A revision of the American Standard B5.17 covering "Markings for Identifying Grinding Wheels and Other Bonded Abrasives" has just been published by the American Society of Mechanical Engineers. Abrasives covered by the standard include segments, bricks, sticks, hones, rubs, and other shapes of tools used to remove material and alter shape or size.

Copies of American Standard B5.17-1958 are available at $1.00 each from the American Standards Association, 70 E. 45 St., N.Y. 17, N.Y.

## Unusable Metals Now Used for Engineering Purposes

Metals formerly considered unusable for engineering purposes are being pushed to development, according to J. P. Denny and L. F. Kendall, Jr., materials experts for the General Electric Co., Schenectady, N.Y., in a paper delivered at the Design Engineering Conference of The American Society of Mechanical Engineers. Metals falling into this category are zirconium, hafnium, tantalum and rhenium.

Zirconium has found wide use in nuclear reactors, explosive primers, heat exchangers and photographic flashbulbs. Hafnium is used in reactors for absorbing excess neutrons. Tantalum is being used in the processing of chlorine, hydrochloric acid, chlorides and nitric acid.

## More Automation Proposed to Counteract Unemployment

Unless industry increases its use of automation, our standard of living will drift lower, our general welfare will be poorer, unemployment will increase and our national security will be in jeopardy—so remarked Chester S. Johns, an executive of Buhr Machine Tool Co., Ann Arbor, Mich., to members of the Hamilton, Ohio, Industrial Management Club.

"Far from throwing men out of work," Johns said, "automation is our main hope today in some industrial areas for keeping men employed at high wages. Without the use of cost-cutting automation, we have little hope of controlling or lowering final costs to a point where more people can buy the products we make. Correctly applied, automation enables us to absorb the cost of our vastly increased production capacity without reducing wages."

## Elgin Abrasives Offers Diamond Reclaim Service

Reclaiming waste or used diamond is a new service announced by the Abrasives Division of the Elgin National Watch Co. This service assures accurate assay of sludge for manufacturers using diamond compounds and powders for lapping or diamond wheels for grinding.

The reclaim service will either assay the entire sludge and buy it outright or will clean, regrade and return the diamond content.

## Man-Made Whirlwinds Cut Industrial Dust

Man-made whirlwinds, which help American industry keep production shops clean and workers healthy, are now performing such demanding jobs as salvaging diamond dust and precious metals and eliminating toxic substances, Torit Mfg. Co., St. Paul, Minn., manufacturer of dust collecting equipment, reports.

The carefully-harnessed cyclones are created inside high-efficiency centrifugal separators which suck up dust from grinding wheels, machine tools and woodworking machinery.

## Round the Clock Food Services

Food services to meet the needs of more than 800 workers in the three plants of Indiana Gear Works, Inc., at Indianapolis, were inaugurated May 5 by The Prophet Co., coast-to-coast food management and consultant firm, headquartered in the Fisher Bldg., Detroit.

## Industrial Diamond Meeting

The Industrial Diamond Assn. of America, Inc., Pompton Plains, N.J., held its 13th annual meeting and convention, May 27-28, at the Hotel Roosevelt, New York. The following officers were elected: Morris Winston, Diamond Drill Carbon Co., President; Donald J. Wallace, Wheel Trueing Tool Co., First Vice-Pres.; Bernard Jolis, U.S. Industrial Diamond Corp., Second Vice-Pres. Directors were also elected.

## Grinding Wheel Institute Golf Winners

R. C. Franklin was the winner of the GWI-AGA Silver Cup at the Golf Tournament held at the Grand Hotel, Point Clear, Ala., on April 30, May 1 and 2. Franklin had a low gross score of 83. He will retain the cup until the 1959 Spring Meeting.

The winner of the Manager's Trophy this year was P.O. Geier, Jr., with a net score of 71.

**"OPERATION 72" SALES MARATHON.** Top executives of the Maytag Co. manning phones day and night for 72 hours took orders for Maytag appliances at the rate of more than one every four seconds. More than $17,000,000 worth of home laundry equipment was sold during the marathon to dealers throughout the United States, Canada, Hawaii and Alaska. On phones at the first table, from left, are Pres. Fred Maytag; George Umbreit, Exec. Vice-Pres.; Claire Ely, Marketing Vice-Pres.; Gerald Ankeny, Gen. Sls. Mgr., and George Owen, Sls. Prom. Mgr.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**271 GROVE AVE.**
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## Engelberg Name Change

John T. Schenck, president of Engelberg Huller Co., Inc., manufacturers of rice and coffee processing equipment since 1888, announced that the company name has now been changed to Engelberg, Inc. Reason for the change, Schenck stated, is the tremendous growth of the firm's abrasive belt grinder division, which in 1957 accounted for about 80% of total sales.

## New Orleans Agent Expands AAF's Product Line

Fred M. Erichson, 5705 St. Roch Ave., New Orleans, has expanded his representation of American Air Filter Co. products to include Herman Nelson classroom unit ventilator products and Herman Nelson heating and ventilating products.

In addition to the above, Erichson now represents the company's air filter, dust control, engine and compressor, and Illinois Engineering heating specialities products.

## Cohu Electronics Has New Division

Creation of a Military Projects Division headed by Dr. Peter H. Kafitz, formerly with the Naval Ordnance Laboratory and the Radiation Laboratory of the Univ. of Calif., was announced by Cohu Electronics, Inc. The new division already has major contracts with the U. S. Navy Department Bureau of Ships and Convair Astronautics.

Headquarters of the Military Projects Division have been established in the Cohu Kin Tel Division plant in San Diego.

Dr. Kafitz, who will direct the new Cohu Division, has worked at the Naval Ordnance Laboratory in Washington, D.C., on the development of the Navy weapons system, and as a research engineer at the Univ. of Calif. Radiation Laboratory in Berkeley.

---

The **Lincoln Electric Co.** Cleveland, has announced the opening of two new district offices in Memphis, Tenn., and Albany, N.Y. **Robert W. Thomas** is the Distrit Manager in the Memphis office, and **Russell S. Hale,** District Manager of the Albany office.

---

**Edward M. Roth, Jr.,** has been named Manager of the Upper New York Sales territory of Becco Chemical Div., Food Machinery and Chemical Corp., Buffalo, New York. **John R. Hopkins** has been promoted to Assistant Sales Manager of the Becco Chemical Div.

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**L. F. Loutrel,** President of Midwest Carbide Corp. for 29 years, has been elected Chairman of the Board, and **James W. Dunham** of Chicago was elected President.

---

**Burt Mendelson** has been promoted to the position of Assistant Director of Marketing for the Communications and Industrial Electronics Div., Motorola, Inc. His duties will include supervision of new product and market planning activities, and assisting in management of all marketing department functions.

A series of three executive promotions have been announced by Copperweld Steel Co., Pittsburgh. **Carl I. Collins** was named Vice-Pres. and Asst. to the Pres.; **Joseph W. Kennedy, Jr.,** was appointed Vice-Pres. in charge of the Superior Steel Div., and **Reid M. Pittenger** was promoted to Vice-Pres. in charge of the Ohio Seamless Tube Div.

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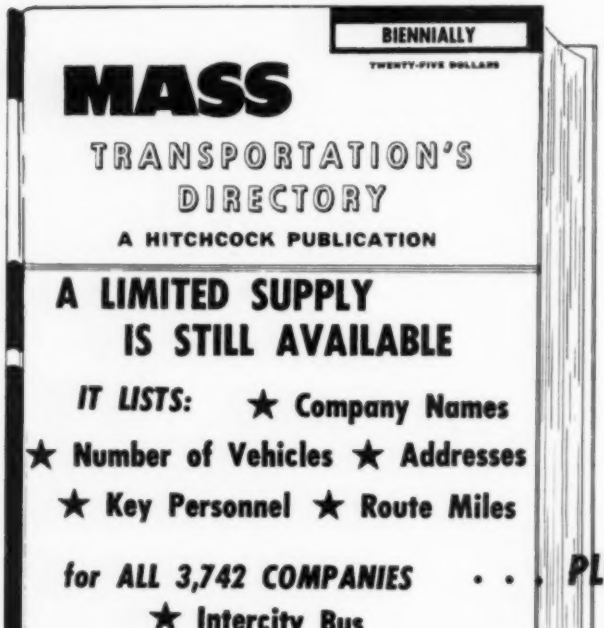
**Norman Pike,** systems and procedures analyst at the Maytag Co., has been elected President of the Systems and Procedures Assn. of Des Moines, Ia.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**ADVERTISING AWARD WINNERS,** Triple Industrial Supply Convention: Front row (l. to r.) E. V. Rankin, Gen. Mgr., The Boston Gear Works, Quincy, Mass.; Roger H. Martin, Asst. Mgr., Tubular Products, Jones & Laughlin Steel Corp., Pittsburgh, Pa.; George L. Logan, Sls. Mgr., Veeder-Root, Inc., Hartford, Conn.; John Corkery, Vice-Pres., Thor Power Tool Co., Chicago; Carl O. Hedner, Asst. Gen. Sls. Mgr., Yale & Towne Mfg. Co., Philadelphia; Robert V. Yohe, Vice-Pres., Sls., B. F. Goodrich Industrial Products Co., Akron, Ohio. Back row (l. to r.) M. A. Hamman, Sls. Mgr., Stock Div., The Bunting Brass & Bronze Co., Toledo, Ohio; W. E. Fruhan, Asst. Mgr., Sls., Pipe Div., Republic Steel Corp., Cleveland, Ohio; T. Gordon Vaughan, Vice-Pres., Sls., The W. M. Pattison Supply Co., Cleveland, Ohio; A. W. Tucker, Vice-Pres., Sls., The Henry G. Thompson & Son Co., New Haven, Conn.; Carl G. Nordmark, Advt. Mgr., The L. S. Starrett Co., Athol, Mass.; L. G. Breckenridge, Sls. Mgr., Simonds Abrasive Co., Philadelphia; Wallace E. Anderson, Vice-Pres., Brown & Sharpe Mfg. Co., Providence, R.I.

## S.P.S.E. Names Conference Program Co-Chairmen

Arthur E. Neumer and Charles F. Fitter, both of Eastman Kodak Co., have been named program co-chairmen for the 1958 annual conference of the Society of Photographic Scientists and Engineers, October 6-10, at the Hotel Manger, Rochester, N.Y.

Fields to be covered by papers will include experimental and theoretical studies, plus practical design of instruments, apparatus, and systems.

---

**The Norton Co.,** Worcester, Mass., has purchased 120 acres of land in Piqua, Ohio. "We have no definite plans for this property in the near future," John Jeppson, Vice-President and Director of Manufacturing, said. "It is an excellent spot and a logical location for a distribution center."

---

**Ellstrom, Inc.**—designers and builders of air and air-electric gaging fixtures, instruments, machine control systems and special machinery—has occupied its new plant facilities located at 32330 Ford Rd., Garden City (Detroit), Mich.

---

**Landis Tool Co.,** Waynesboro, Pa., has appointed the **Wm. C. Johnson & Sons Machinery Co.,** St. Louis, Mo., as distributor in eastern Missouri and southern Illinois.

---

**Southport Engineering Co.,** Los Angeles, has been named by **Solar Aircraft Co.** as the sales representative for its industrial bellows and expansion joints in the Southern California area. **Diepenbrink & Schoonhoven,** Chicago, has been assigned the territory of northern Illinois, northwest Indiana, three counties in southwest Michigan and southeast Wisconsin. **Power Specialty Co.,** Houston, Tex., represents Solar in the Texas and Louisiana gulf area.

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**National Editorial Services,** Detroit-based national industrial publicity and public relations firm, formerly at 685 Pallister, has moved to 380 Hilton Road.

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## New BDSA Reservist

Arthur T. Dalton, of Chicago Wheel & Mfg. Co., was one of thirty executives added recently to the Business and Defense Services Administration unit of the National Defense Executive Reserve. So far there are 680, with a total expected of 1,500.

This corps is being trained to direct operations of an emergency production agency in event of hostilities. About 75% chosen thus far have had prior civilian service, on loan from their companies, either during the Korean emergency or World War II, or since then as without-compensation temporary employees in BDSA.

---

**Paul P. Huffard,** a director of the Union Carbide Corp., has been elected to the Board of Directors of Greer Hydraulics, Inc., New York International Airport, Jamaica, N.Y.


**NO NEED FOR COSTLY DIAMOND WHEEL DRESSING**

Diamond Grinding Wheels Contoured to Your Specs. . . . With our Electro Formed Nickel Matrix. The Ultimate in Shape Retention at a Fraction of Your Current Wheel Costs.

Diamond Quills Available from .014" diameter Cut-off Wheels down to .004" in thickness.

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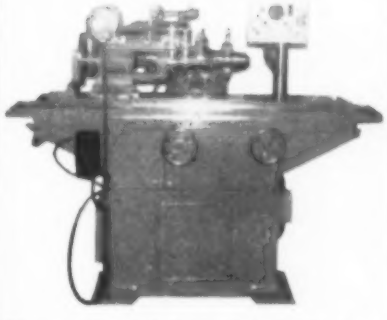

**New Machine To Grind Carbide Throwaway Tools**

Carbide throwaway tools can now be ground with sides flat and parallel within 0.0002 in. on a new machine. The machine will grind the entire periphery including the radius in one operation. It will grind any shape tool, including squares, triangles, pentagons, diamond shapes and rounds. It will grind any radius from 0.010 up on negative and positive rake tools and will hold a 0.0005-in. tolerance. It will also regrind throwaway tools so they can be used again at a fraction of their original cost.

*Write for literature.*

**HARVILL MACHINE CO.**
618 East 10-Mile Rd., Hazel Park, Michigan

## Pratt & Whitney Appointments

A. L. Knapp

E. J. Shages

In a move to expand the responsibility of its divisional executive officers, Pratt & Whitney Co., Inc., announced that Albert L. Knapp, Vice-President and Manager of the company's Machinery Division, and Edward J. Shages, Vice-President and Manager of its Cutting Tool and Gage Divisions, had been named to head the sales activities of their respective operations.

Knapp came to be with the firm in 1928 and Shages in 1929; and they have risen through the ranks to the firm's Board of Directors, and a Vice-President of the company, respectively.

---

Fred D. Watson, formerly on the sales staff of the Milwaukee office of the Pratt & Whitney Company, W. Hartford, Conn., has been named District Manager of the Rochester branch. He replaces Stanley E. Huffman, who is no longer associated with the company.

James H. Daley, formerly on the sales staff of the Rochester territory, has been named to succeed E. W. Chambers, District Manager at Cincinnati, who has retired.

Three sales representatives from the Hartford office are being transferred to the district branches.

---

## Norton Co. Changes

Creation of a new department and several personnel changes in Norton Co.'s Abrasive Division sales organization have been announced.

Robert G. Van Keuren will head the newly-created Product Engineering Dept. as Manager of Product Engineering. Frank G. Gustafson has been named Supervisor of Sales Engineering. The new department has been established to work on long range objectives in product improvement, determine the need for new products, and evaluate results of field tests on products.

The Sales Engineering Dept., which formerly included some of the functions of the new Product Engineering Dept., is now divided geographically by sales districts.

John U. Calder, formerly Supervisor of the Sales Service Dept., has been appointed Price Specialist. John Clark, Jr., has been named head of the Vitrified Products Section of the Product Engineering Dept.

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## Sheffield Corp. Appointment

Appointment of Oscar A. Ahlers to the position of General Manager of The Sheffield Corp., Dayton, Ohio, was announced. In addition to previous responsibilities, he now supervises all sales, product divisions and field service manufacturing facilities.

Ahlers has been with the organization more than 32 years.

---

**Gerald J. Horvitz,** former Technical Director, has been elected to the Presidency of the New York Testing Laboratories, Inc., environmental and electronic testing center of New York City. Other officers are: **Robert Slegman,** Vice-President; **Gerald Harvey,** Secretary and Technical Director, **Roger Harvey,** Treasurer and Managing Director.

---

A new sales trainee at Latrobe Steel Co., Latrobe, Pa., is **John C. Watt, Jr.,** who will work alongside the firm's management men in nearly every phase of the tool steel and super alloy steel business.

---

**Leon T. Matthys** is now Advertising Manager of National Automatic Tool Co., Inc., Richmond, Ind. Matthys will direct the firm's advertising, sales promotion, and public relations activities.


**FOR FASTER GRINDING at LOWER COST**

USE A.I.T. Diamond Wheels for all Carbide Grinding

RESIN **B-60** Cup Type Diamond Wheel

The exclusive B-60 Bond used in A.I.T. bonded diamond wheels has been field tested in over 400 plants. We can *prove* these superior advantages to you in YOUR plant:

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- Wheel grinds cooler—does not fracture carbide
- Corners stay sharper longer
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- NEW BACKING dissipates heat faster
- No down-time for dressing inside body section

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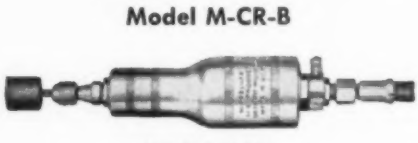

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Model HD-CR

**Outstanding, powerful, fast-cutting tools of proven high efficiency. Designed for tough jobs and real production. Perform indefinitely and dependably. Precision made. Steel housing for safety. Also other models.**

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**HOERBIGER CORPORATION OF AMERICA** has commenced operations at its new headquarters at 160 Van Brunt St., Brooklyn 31, N.Y. This international manufacturer of valves and valve components for air, gas and refrigerating compressors, compressor regulators, diesel engine scavenging valves and related products, now brings its facilities to the United States.

## Bay State Adds to Detroit Sales Organization

**August David Diedrich, Jr.,** joined the Michigan District sales organization of the Bay State Abrasive Products Co.

Diedrich brings to his new responsibilities five years of previous abrasive engineering experience with Midwest Abrasive Co., Detroit.

---

**Richard L. Engel** has been named Manager of Allis-Chalmers Industries Group Pacific Region. He had been manager of the group's Los Angeles district since 1953, having been with Allis-Chalmers since 1939.

**Donald E. Steele** becomes Manager of the Los Angeles district succeeding Engel. He had been Manager of petroleum and chemical sales at Los Angeles since 1956.

---

A. D. Diedrich, Jr.

D. W. Sabean

**Donald W. Sabean** succeeds **R. G. Balcom** as President of Abrasive Products, Inc., South Braintree, Mass., manufacturer of coated abrasive papers and cloths. Sabean was formerly company Treasurer. R. G. Balcom died March 7, after thirty years as company president.

Other officers elected at the corporation's annual meeting were : **Alger L. MacLennan, Fred W. Harrington,** and **Donald E. Miller,** Vice-Presidents; **Philip D. Balcom,** Treasurer, and **Robert J. Pyee,** Assistant-Treasurer.

---

C. H. Foltz, Jr.

T. M. Hankin

Norton Co. has appointed two new field engineers: **Carl H. Foltz, Jr.,** has been assigned to the Chicago office, and **Thomas M. Hankin** to the Atlanta office.

---

**W. Mel Taylor,** whose long experience in sales administration and business management has made him familiar with many different industrial markets, has joined F. J. Stokes Corp., Philadelphia, as Assistant to the Vice-President, Sales, and Manager of Marketing.

---

**W. Samuel Carpenter, III,** Director of Sales of du Pont's Petroleum Chemicals Division, became Assistant General Manager of the company's Electrochemicals Department. He succeeds **Charles B. McCoy,** who has been named General Manager of the Elastomer Chemicals Department.

---

**Arvid Willen** has been appointed by the Alsop Engineering Corp., Milldale, Conn., to its sales engineering staff and will serve the territory covering Conn., New York State above Westchester County, Western Mass., and part of Vt.

---

A. Willen

D. R. Scott

**D. Rex Scott** is the new Manager of Planning for Robertshaw-Fulton Controls Co. He has been with the company since 1950, serving in the Legal Department and for the last three years in the Sales Department with offices in Cleveland, Ohio.

---

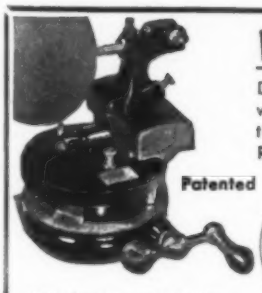
H. H. Gillespie

H. L. Wright

**Harold H. Gillespie** is the new General Manager of the Split Ballbearing Div. of Miniature Bearings, Inc., Lebanon, N.H. Gillespie was formerly Vice-Pres. and Asst. Gen. Mgr. of the Barden Corp., Danbury, Conn.

---

**Howard L. Wright** has been appointed Manager of Special Products Sales, Hanson-Van Winkle-Munning Co., Matawan, N.J. He has been with the firm for eleven years, serving as District Manager in the Middle Atlantic States area.

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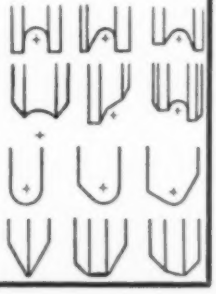

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*Inquiries Invited!*

## NEWS OF INDUSTRY *continued*

H. Y. de Schepper

C. E. Griffith

**Harry Y. de Schepper** and **Charles E. Griffith** have been elected Vice-Presidents of R. W. Greeff & Co., Inc., New York. Both have been with the company for over twenty years.

Three transfers within the sales organization of American Air Filter Co., Inc., have been announced. **Charles Kannapell** has been transferred to the Washington branch office; **Collins Hamblen,** to the New York City branch office, and **Charles Jacobs,** to the New York City branch office.

Appointment of **E. W. Schoen** as Chief Metallurgist for Huck Mfg. Co., Detroit, has been announced. In his new position, Schoen will be responsible for all metallurgical problems that arise in the manufacture and research of Huck products.

**Grant A. Morrison,** formerly Engineering Administrator, has been named Manager of Product Design and Application Engineering at the Metallurgical Products Dept. of General Electric Co., Detroit. Morrison joined GE in 1951 and was in tool sales work in Wichita, Kansas, Tulsa and Houston.

**John E. Knight** has been named North Central Area Sales Representative for the Industrial Products Div. of The Pioneer Rubber Co. of Willard, Ohio, makers of industrial gloves. His territory will cover Ill., Ind., Ia., Ky., Minn., Mo., Nebr., N. Dak., S. Dak., and Wis.

G. A. Morrison

J. E. Knight

**Richard H. Fogarty** has been named Pipe Welding Engineer of the Tube Turns Div. (Louisville, Ky.), of the Chemetron Corp. He will work with contractors, engineers and users of industrial piping in the solution of welded piping problems.

E. T. Doyle

R. B. Harlan, Jr.

**Edward T. Doyle,** formerly Manager of the Tracer Division of Lehigh, Inc., has been appointed Sales Manager of the Tool Division of General Machine Co., Emmaus, Pa. He will be active in the establishment of distribution for the company's new Non-Flex cut-off tool.

Establishment of a new Western branch of **Pesco Products Div., Borg-Warner Corp.,** in Los Angeles, for the production of special-purpose a-c generating equipment, has been announced. Named General Manager of the branch is **R. B. Harlan, Jr.,** former Western Regional Sales Manager for Pesco. Operations Manager is Allen T. Puder.


DEMONSTRABLY, the WORLD'S FINEST
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**AVAILABLE IN RESTRICTED TERRITORIES**
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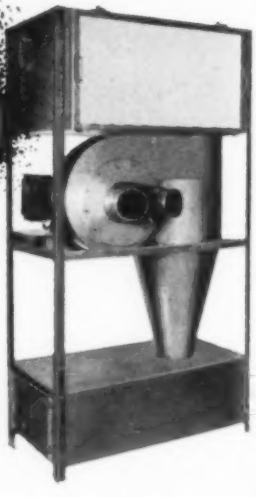

Easy installation . . . efficient low-cost operation . . . simplified maintenance, make Dustkop *FIRST* among equipment to collect most all industrial dusts. There are Dustkop models to eliminate your dust problems . . . that are space saving, self-contained units; or exhaust type for rafter, ceiling or outside location. Write for descriptive literature.

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- Special fold down belt guard for maximum safety and faster belt changing.

**THIS IS A HIGH SPEED GRINDER NOT A SANDER*

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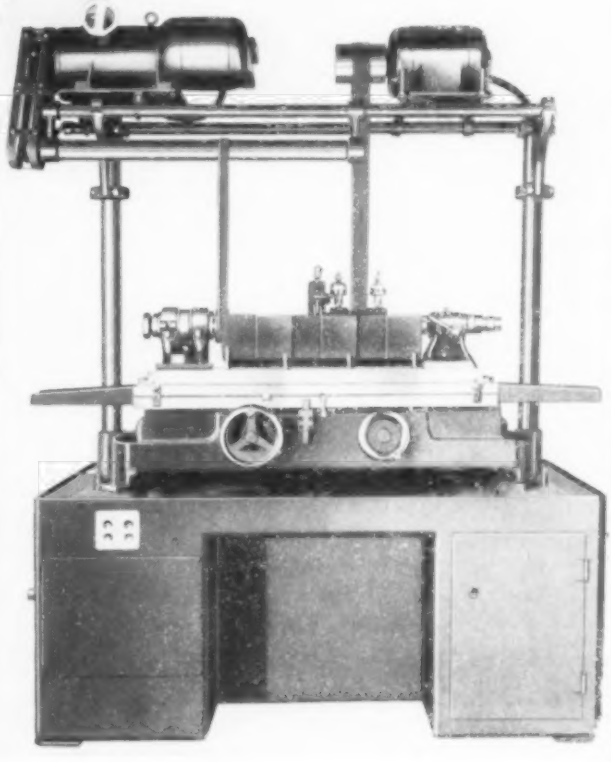
A CRYSTAL LAKE GRINDER will hold size as well as grind round from .000005 to .000020" and finish from One to Four Microinch SURFACE FINISH. The essentials in grinding are a round spindle, taper bearings, a spindle that can be adjusted periodically without the squashing of bronze boxes and to have belt pressure ninety degrees from grinding pressure so the bronze boxes will not wear out of round.

For example, fuel injectors, after having been rough ground, can be ground to .000010" roundness with a sixty grit wheel and one pass of the wheel.



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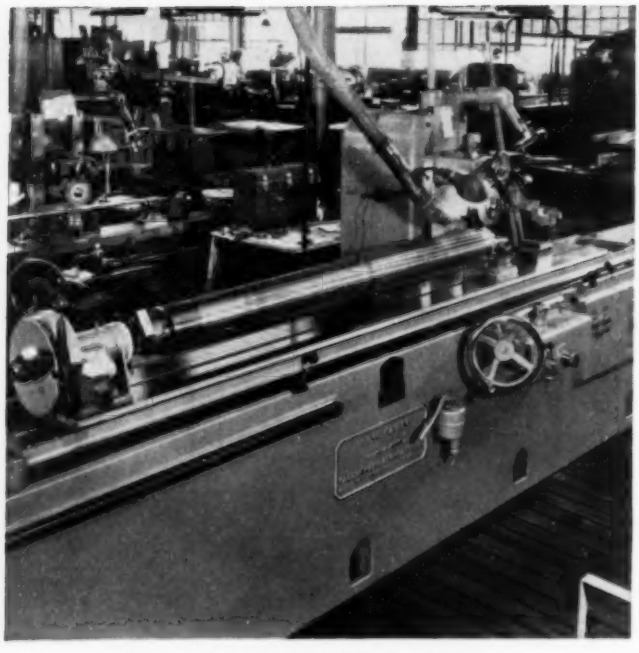

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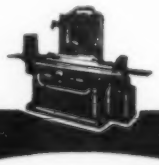
May we tell you more? A note on your letterhead will bring full details.



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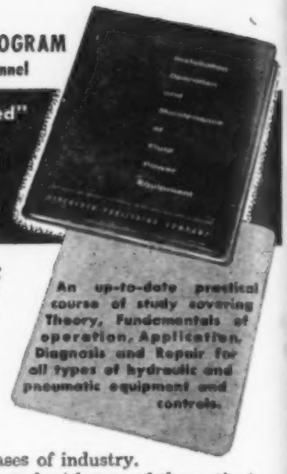
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## *and* the metal, too!

## with NEW

# MACKLIN B-20

## RESINOID SNAGGING WHEELS

For floor stands, portables, swing-frames, and cut-off, too, users report more production per wheel dollar with the new Macklin B-20 wheel. There's a *sound* engineering reason for this. The B-20 is tough. It gives better impact resistance. More and sharper cutting edges provide extremely free cutting . . . better heat resistance. *Start saving now.* Test the B-20 on your own job.

**HERE'S PROOF OF PERFORMANCE**

- "Extremely fast, superior life, on steel castings"
- "Very satisfactory cutting off valve stems."
- "Increased production 15% stand grinding pearlitic malleable castings."
- "Best wheel ever used for slitting piston rings. No burr."

*For complete facts and specifications send for B-20 literature today.*

GRINDING WHEELS

**MACKLIN company**

Dept. 63, Jackson, Michigan

MACKLIN OF CANADA, LTD., Harrow, Ont., Canada

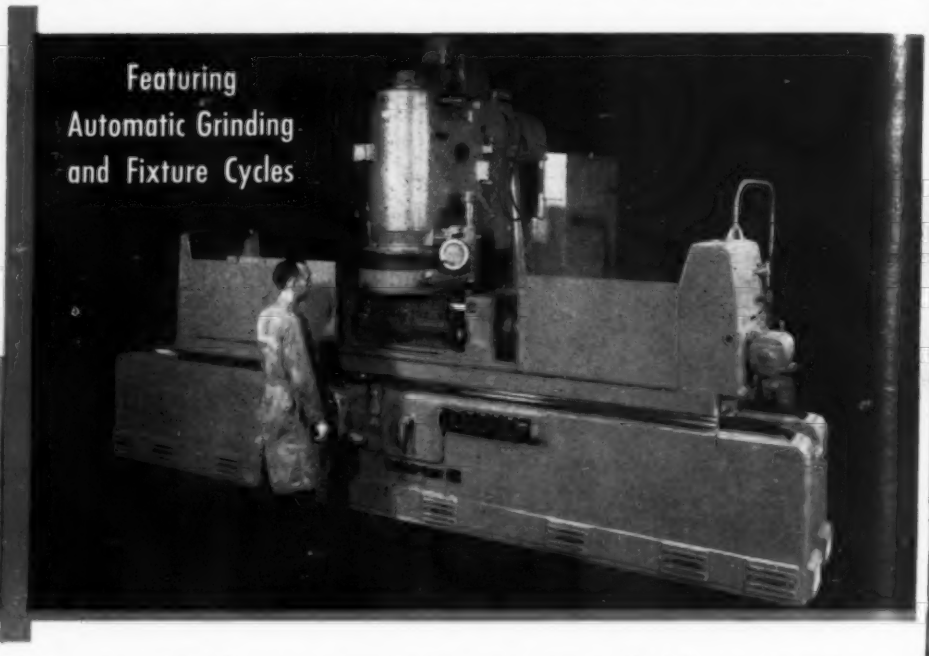
# THOMPSON handles the toughest production jobs... *fast and accurately...*

*with*

## THE VERTICAL SPINDLE SURFACE GRINDER

**SPECIFICATIONS**

**Size:** 18" x 18" x 62"
**Wheel:** 22" Segmental
**Production:** 30 blocks per hour
**Total Stock Removal:** .010"



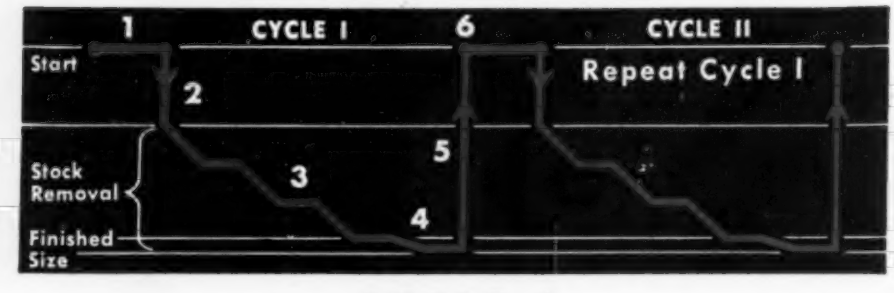

Shown above is the latest Thompson vertical spindle machine grinding the diesel engine cylinder blocks of a leading truck manufacturer. To meet the demand for fast, continuous production, both the fixture and grinding cycles are automatic and are interlocked to prevent accident. A separate hydraulic power source operates the single place fixture which locates the cylinder block on the main bearing holes.

Since any variations in stock removal would affect the compression ratio of the engines, constant accuracy is controlled throughout the grinding cycle. The operator merely sets wheel contact with the work and automatic operation begins.

Thompson vertical spindle surface grinders are made in various types and sizes to meet all job requirements. All machines of 40 inches and up in work length are equipped with the Hydra-Cool Hydraulic System*—the exclusive Thompson feature that eliminates all heat distortion throughout the machine.

*Pat. Applied For

**MACHINE CYCLE (Total Stock Removal .010")**




### CYCLE I

1. Load work piece into fixture and start table cycle.
2. * Manually lower grinding wheel to contact work piece.
3. Automatic downfeed of wheel occurs at each table reverse to remove .010" stock.
4. Spark out to final size with table moving to start position.
5. * Manually elevate grinding wheel to starting position and release work piece in fixture.
6. Table automatically stops.

*Can be furnished as automatic functions.*

Thompson
SURFACE GRINDERS

**THE THOMPSON GRINDER CO.**
**SPRINGFIELD, OHIO**

"Keep Thompson in mind for that daily grind"